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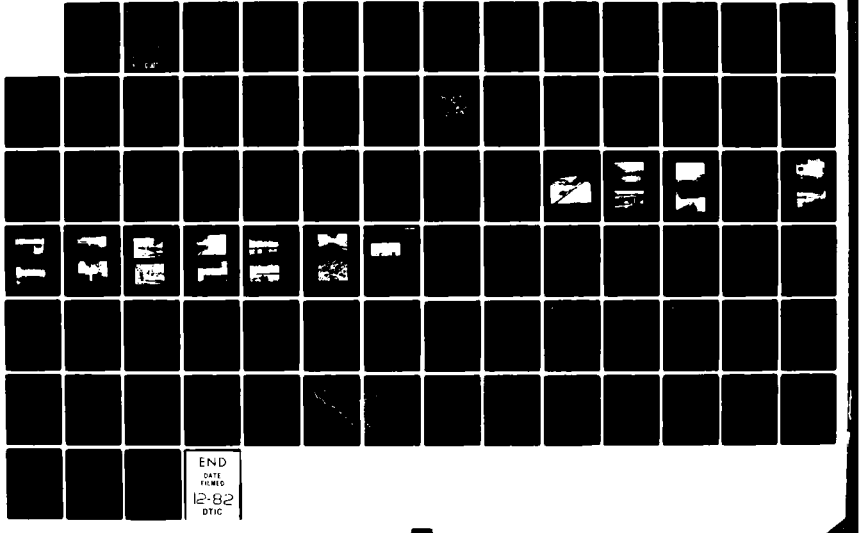

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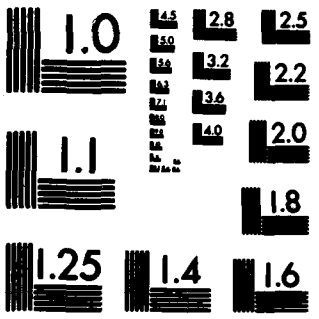

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LAC QUI PARLE FLOOD CONTROL PROJECT
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DEVELOPMENT AND RESOURCE MANAGEMENT

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Lac qui Parle

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Lac qui Parle flood control project is located in west central Minnesota, near the South Dakota border. The existing project includes dams at the outlets of Lac qui Parle and Marsh lakes; a diversion channel for Chippewa River floodwaters; necessary alterations of highways, railroads, and bridges in the vicinity; and channel improvements along the Minnesota River. Project considerations include the need for clearing and snagging operations between Lac qui Parle Dam and Granite Falls; maintenance and improvement of nearby recreation

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facilities; provision of an interpretive program; a new recreation area at the west side of Marsh Lake Dam; and improved access for the handicapped.

LAC QUI PARLE FLOOD CONTROL PROJECT
MASTER PLAN FOR PUBLIC USE
DEVELOPMENT AND RESOURCE MANAGEMENT

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PHYSICAL AND OPERATIONAL DATA
LAC QUI PARLE AND MARSH LAKE DAMS

LAC QUI PARLE DAM

Drainage area	6,100 square miles
Maximum discharge of record and year	19,700 cfs, 1952
Conservation pool elevation	931.2
Full pool elevation	941.1
Capacity at conservation pool	29,700 acre-feet
Capacity at full pool	122,800 acre-feet
Embankment crest elevation	946.0
Surface acres - conservation pool	6,400 acres

MARSH LAKE DAM

Drainage area	2,800 square miles
Maximum pool elevation and date	943.78, 14 April 1952
Conservation pool elevation	937.6
Full pool elevation	941.1
Capacity at conservation pool	12,050 acre-feet
Capacity at full pool	35,000 acre-feet
Embankment crest elevation	948.6 to 952.6
Surface acres - conservation pool	5,200 acres

1.00 INTRODUCTION

1.01 Authorizations

The Lac qui Parle Flood Control Project was authorized as a Federal project by the Flood Control Act of 1936.

1.02 Section 4 of the Flood Control Act of 1944, as amended, provided the Corps with the basic authority to develop recreation facilities at this project. Additional authority was given by Section 209 of the Flood Control Act of 1954, Section 207 of the Flood Control Act of 1962, and in 1965 by the Land and Water Conservation Act and the Federal Water Project Recreation Act (P.L. 89-72). These Acts further defined the role of the Corps in providing recreation at reservoir and non-reservoir projects. Public Law 89-72 established the requirements for cost-sharing non-Federal sponsorship of recreation developments at Federal water projects.

1.03 The authority and responsibility to develop master plans for public use development and resource management are contained in ER 1120-2-400 and ER 1130-2-400. These Engineering Regulations, "The Design of Recreation Sites, Areas, and Facilities" and "Project Operation -- Recreation Resource Management," stipulate that a continuing schedule for re-evaluation of master plans for completed projects be established. This study implements that requirement, and provides a comprehensive evaluation of existing conditions and facilities.

1.04 Purposes and Objectives of the Study

One purpose of this study is to review all aspects of the existing use, current management practices, and the existing master plan for the project, and to propose needed modifications to insure proper resource development, protection, and management. An important objective of the study is to insure the coordination and compatibility of the Corps management plans with the management plans and objectives of other interested agencies and the desires of the using public.

1.05 Scope of the Study

The adjoining five Minnesota counties (Lac qui Parle, Yellow Medicine, Chippewa, Big Stone, and Swift) are assumed to be the zone of influence for the project (Plate 1). This report discusses pertinent resource factors within the five counties that might affect resource development-and-use decisions.

2.00 PROJECT DESCRIPTION

2.01 Location

The Lac qui Parle flood control project, which includes Marsh Lake, Lac qui Parle Lake, the Chippewa River Diversion, and the Minnesota River between the head of Marsh Lake and Granite Falls, is located in westcentral Minnesota, in

Minnesota Economic Development Region 6W, near the South Dakota border (Plate 1). The project forms the northeastern boundary of Lac qui Parle County and the southwesterly boundaries of Chippewa, Swift, and Big Stone Counties. The Lac qui Parle Dam is approximately 7 miles northwest of Montevideo, Minnesota, and 288.1 river miles above the mouth of the Minnesota River. Marsh Lake Dam is farther upriver at river mile 303.5. At normal or conservation pool level, the two impoundments extend upstream for a total distance of about 27 miles from the Lac qui Parle Dam.

2.02 Function

Lac qui Parle is a multipurpose water resource project. It is designed to provide 116,500 acre-feet of storage above the normal conservation levels of Lac qui Parle and Marsh Lakes during flood periods; and at conservation level, low-water flow is improved for agriculture, recreation, fish and wildlife conservation, power, and dilution of sewage effluents at Granite Falls.

2.03 Project History

Before damming, Lac qui Parle and Marsh Lakes were widenings of the Minnesota River created by alluvial fans of ancient tributaries. In modern times Marsh Lake was an area of potholes and sloughs, and Lac qui Parle Lake had a much smaller open-water area.

2.04 A project for flood control at Lac qui Parle Lake was first proposed by the State of Minnesota in the first Biennial Report of the Commissioner of Drainage and Waters in 1921, after several floods occurred in the Minnesota River Valley, culminating in the major flood of June 1919. Additional data were given in the Second Biennial Report of the Commissioner, dated 1923. On 1 March 1934, the St. Paul District, U.S. Army Corps of Engineers (then United States Engineer Office) submitted a brief report on the Minnesota River which contained a description and cost estimate for the Lac qui Parle flood control project based on the two previous biennial reports. In 1922 or 1923, the Minnesota Game and Fish Commission constructed a lowhead dam about 1.3 miles above the present dam. This structure was removed prior to completion of the existing dam in 1939. Construction of Lac qui Parle Lake was initiated early in 1936 as a Works Progress Administration project sponsored by the State of Minnesota prior to its authorization by the Flood Control Act approved 22 June 1936. The Corps constructed its portion of the project, including Marsh Lake Dam, between 1941 and 1951. On 7 September 1950, operation of the project was transferred from the State of Minnesota to the Corps of Engineers. Land acquisition was completed by the Corps during March 1961.

2.05 Description of Project Features

The existing project includes dams at the outlets of Lac qui Parle and Marsh Lakes; a diversion channel for diverting floodwaters of the Chippewa River into the Watson Sag near Watson, Minnesota, hence into Lac qui Parle Lake;

necessary alterations of highways, railroads, and bridges in the vicinity; and improvement of the channel of the Minnesota River at various locations on the 43.1 miles between Lac qui Parle Dam and Granite Falls (see Plate 2).

2.06 The main dam, Lac qui Parle, carries a County-State Aid Highway across the Minnesota River. The earth-filled embankment is about 4,100 feet long with a 32-foot-wide roadway on top. The control structure consists of a fixed concrete spillway section and a concrete curtain wall section. Low-flow discharge is regulated by Bay Number 2 (which has three vertical lift gates), while the movable steel bulkheads in the spillway section function during flood operations.

2.07 Marsh Lake Dam, also earth-filled, is approximately 11,800 feet in length with a 10-foot top width. There is a two-lane public roadway on the east bank of the dam. The outlet structure is a concrete fixed-crest overflow. During low-water periods when the water level is below the crest of the dam, the discharge is regulated by a 2-foot sluice gate in the main spillway.

2.08 The Chippewa diversion channel, about 3,500 feet in length, cuts through a part of a natural ridge which separates the Chippewa River from the abandoned glacial channel known as the Watson Sag. The Chippewa River diversion dam is the main structure for diverting a portion of Chippewa River floodwaters into Lac qui Parle Lake. The dam is constructed of rolled-earth fill and carries a 32-foot highway across the Chippewa River at elevation 950.3. Total length of the dam, including the main control structure and low-water control culvert, is about 1,900 feet. The main control structure is a five-span combination highway bridge and dam. Bay 3 provides discharge control by a tainter gate, while the other bays have a fixed-crest spillway. The low-water control culvert, which was used prior to installation of the tainter gate in 1941, is controlled by a 4-foot by 4-foot vertical lift gate.

2.09 Operations

Although the detailed operations of the dam are complex, the basic objectives are relatively simple. Starting at freeze-up, Lac qui Parle Lake is drawn down to elevation 930 feet or less. This drawdown must be completed by 15 March, and the discharge is not allowed to exceed the downstream Minnesota River capacity of 1,500 cfs. During the spring, inflow usually exceeds 1,500 cfs on the Minnesota River and 1,000 cfs on the Chippewa River. At this time, water flows from the Chippewa River through the diversion channel into Lac qui Parle Lake. As Lac qui Parle Lake rises, a level of 931.2 feet is maintained by opening the Lac qui Parle Dam gates. If the water continues to rise, the pool level will reach the fixed crest spillways at 934.2 feet, and more water will be released downstream. When the pool rises above 941.1 feet, water flows over the

emergency spillway, and free river conditions exist. As floodwaters subside, the discharge is reduced to 1,500 cfs, while the pool is lowered to 941.2 feet. When the Chippewa River flow drops to 1,000 cfs, water diversion to Lac qui Parle Lake is limited to 3 to 6 cfs through the Watson Sag, which helps minimize stagnant conditions in the diversion channel and Watson Sag. Heavy rains may necessitate similar operation of the control system. Before 1 May, flooding causes little agricultural damage, and inflows are discharged as quickly as possible. However, flooding after this date can cause severe agricultural damage. Therefore, outflow is reduced at this time and floodwaters are stored, elevating the pool above 931.2 feet. Flood control practices cause widely and often rapidly fluctuating water levels.

2.10 Periodic clearing and snagging operations are conducted in the Minnesota River channel between Lac qui Parle Dam and Granite Falls. Trees lying within the channel and those that are about to fall into the channel are removed. The trees removed are piled along the banks for wildlife cover.

2.11 Construction Project Status

Managed by the St. Paul District, Corps of Engineers, the project is fully operational.

2.12 Operating Project Status

The existing project has been in operation since 1939.

2.13 The amount of Federal land administered by the Corps of Engineers in fee title is approximately 578 acres, of which approximately 347 acres are currently leased to the Minnesota Department of Natural Resources for fish and wildlife management purposes. Approximately 78 acres are permanently flooded. The remaining 153 acres of land consist mainly of the dam proper with related facilities and public-use areas (see Plate 2). A more detailed description is contained in Section 6 (Site Description and Evaluation).

2.14 No concessions or special uses presently exist or are anticipated.

3.00 NATURAL FACTORS AFFECTING RESOURCE DEVELOPMENT

3.01 Geology and Topography

Most of the State of Minnesota is covered by glacial deposits, and therefore much of the land surface consists of features derived from the several different ice sheets that advanced and then retreated. During the Pleistocene Epoch, Minnesota was overrun at various times by continental ice sheets, except for a small area in the extreme southeastern corner. The debris left by these ice sheets covered the original landscape to depths ranging from 100 feet to over

400 feet. The glacial till in the area of the Lac qui Parle project is made up principally of clays containing a noticeable amount of sand and gravel, with the surface layers (composed of decayed vegetation about 2 feet thick) forming a rich black soil.

3.02 About 10,000 years ago, with the retreat of the last (Keewatin) ice sheet, a huge lake began to form at the base of the melting ice sheet. Since the original drains had been filled by the drift, there was no place for this water to drain naturally until the rising water level reached a height from which it could drain to the south. Before drainage in this direction became possible, the lake reached a size estimated from its ancient beach ridges to have been from 100 to 200 miles in width and more than 600 miles in length. This was glacial Lake Agassiz.

3.03 When drainage began, an outlet was formed which is now occupied by Big Stone Lake and Lake Traverse. The formation of these lakes was caused by the alluvial deposits of the Whetstone and Little Minnesota Rivers after the drainage of Lake Agassiz was completed. While the outflow from the outlet was to the south initially for about 50 miles, the general direction was southeast due to a flatiron-shaped plateau known as the Coteau des Prairies, a morainal ridge extending from South Dakota in a southeasterly direction across Minnesota and into Iowa. The elevation of the crest of this ridge was nearly 2,000 feet above sea level. As the tremendous outflow from Lake Agassiz increased, so did the erosion into the drift, and thus the Minnesota River Valley was created. Over its length of 330 miles from Big Stone Lake to the mouth, this ancient river channel ranged in width from 1 to 5 miles and in depth to 150 feet or more. From the lower end of the outlet at Ortonville, Minnesota, to the vicinity of Lac qui Parle, the erosion carried down to the Archean bedrock of the original landscape.

3.04 The prehistoric river which created the Minnesota River Valley was named the River Warren in honor of General G.K. Warren, who first explained the origin of the valley in his report on the Examination and Survey of the Minnesota River published as Ex. Doc. #76, Forty-third Congress, Second Session, 1866-67. General Warren's surveys, maps, descriptions, and discussions were considered a valuable contribution to science.

3.05 When the draining of Lake Agassiz was completed, siltation of the main channel began. Tributary streams created alluvial fans where they entered the main stream. However, erosion of these tributary valleys did not reach the Archean rock as it did in the main channel. Erosion stopped at depths of 40 to 50 feet below the present drift on a moraine of an earlier ice age which was composed of granite, syenite, and gneiss.

3.06 Tributary streams entering from the south have their origin in the above-mentioned Coteau des Prairies, and these streams descend rather rapidly from the upland areas, some dropping as much as 500 feet in a few miles. The Lac qui Parle River is such a stream; it drops 790 feet in a 66-mile reach, with the greatest fall (250 feet) occurring in an 8-mile reach near Canby, Minnesota. In the lowland plains adjacent to the main Minnesota River channel, the gradient is usually less than 2.0 feet per mile, but in the lower 18 miles to the mouth, the fall is about 14.0 feet per mile. Tributaries entering from the north, such as the Pomme de Terre and Chippewa Rivers, are divided by north-south morainal hills which rise less than 75 feet above the water courses. Drainage in the upland regions of these streams is rather poorly defined, with small lakes and marshy areas marking the watercourses. Between the Pomme de Terre and Chippewa River mouths are some ancient channels distinct from, but within, the main Minnesota River Valley, which were produced by these streams and which carry flows only during periods of extreme floods. One of these abandoned channels is known as the Watson Sag.

3.07 Lac qui Parle was created by an alluvial fan deposited in the Glacial River Warren channel by the Chippewa River tributaries.

3.08 Soils

The area soils range from productive soils conducive to intensive agriculture, through stony soils and rock outcrops, to poorly drained or frequently flooded soils. The characteristic soil associations in the area are generally delineated by topography. In the Minnesota River bottoms, the alluvial soils are frequently flooded. Rising from the floodplain is the terrace escarpment, having easily eroded and droughty soils. Above the escarpment, soils occur on a flat, gently rolling terrace. These soils are variable and may be stony, poorly drained, or suited to agriculture. These soils are generally fertile and have been cultivated where limitations are absent or where drainage and stone removal are economically feasible.

3.09 The soils of the immediate project area have been classified by the Soil Conservation Service in the Nearly Level Flood Plain group, Chaska-Dorchester-Oshawa Rocky Benches Association. This group appears along the course of the Minnesota River throughout this region. This area shows the evidence of a very long period of erosion by the Glacial River Warren and its offspring, the Minnesota. The soils in this area are generally very light and often range to sand and gravel. Most of this area is quite rocky, with steep slopes and ravines running around and through it, and requires permanent cover. Desirable land uses are pasture, wildlife habitat, and recreation. Only a very small portion of the area is suitable to cultivation.

3.10 Slopes

The project lies entirely within the valley of Glacial River Warren. Within the bluffs of the valley, the land is generally level, although there is variability along the shorelines. Along Lac qui Parle Lake, shorelines are steep to gradually sloping, with vegetation ranging from dense stands of cattail to sparse stands of grasses and sedges. Marsh Lake shorelines are more gradually sloping with dense vegetation up to the water's edge. The shorelines include smooth mud-sand or sand and coarse gravel beaches as well as areas with large, scattered boulders. Bottoms are sandy-mud or silt in shallows and become muck in deeper areas. Shoreline erosion is not a problem.

3.11 Land Use

Land use in westcentral Minnesota is predominantly agricultural. Approximately 78 percent of the five counties surrounding Lac qui Parle are in crop lands. The acreages and percentages of each are displayed in Table 1.

Table 1 Existing Land Use

Categories	Acreage	Percent
Croplands	1,692,642	78.5
Pasture	142,174	6.6
Wooded	8,861	.4
Open	92,788	4.3
Rural Buildings	41,429	1.9
Park-Recreation	4,292	.2
Wildlife	67,519	3.1
Roads	51,800	2.4
Urban	23,010	1.1
Other	32,215	1.5
Total	2,156,800	100.0

3.12 Vegetation

When European explorers came to the Lac qui Parle area, the predominant vegetation type was prairie. Bottomland hardwood forests occupied narrow strips along the various rivers, and numerous wetlands dotted the landscape. With settlement and expanding agriculture, the prairie was converted to croplands. Most of the wetlands in the region have disappeared either by natural processes or artificial drainage to create "productive" farmlands. Today the predominant vegetation is crops, such as corn and soybeans. Forest remnants can be found along the rivers. Remaining wetlands are either in public ownership and held for wildlife purposes or in areas with severe agricultural limitations.

3.13 Water Resources

Surface Waters

The Big Stone Lake, Pomme de Terre River, Yellow Bank River, Lac qui Parle River, and Chippewa River watersheds contribute to the project. In addition, the Little Minnesota and Whetstone Rivers drain portions of eastern South Dakota and contribute to the watersheds. Runoff from 4,050 square miles passes through the Lac qui Parle Dam. Water from a portion of the 2,050-square-mile Chippewa River watershed is also diverted, at times, to Lac qui Parle Lake for flood control. Lac qui Parle and Marsh Lakes and the Minnesota River are the most prominent watershed features in the region.

3.14 The Pomme de Terre River, entering Marsh Lake from the north above the dam, and the Lac qui Parle River, entering Lac qui Parle Lake just above the dam from the south, are important tributary streams. Combined, their average stream discharges equal more than 30 percent of the average Minnesota River flow at the Lac qui Parle Dam. Three other streams enter the lakes, but contribute less than 10 percent of the average flow.

3.15 Groundwater

Groundwater in the region is recharged in the uplands and flows toward the river valley where it is discharged through runoff and evapotranspiration. Precipitation infiltrates the soil and moves through the relatively impermeable glacial till. Water flowing toward the valley concentrates in sand and gravel aquifers which occur as surficial deposits or as "lenses" buried up to 150 feet deep in the glacial till.

3.16 Wells in the Lac qui Parle vicinity usually tap these sand and gravel aquifers and yield about 15 gallons per minute. These flows are adequate for rural domestic and livestock use. Larger wells yield an average 255 gallons per minute, a low to moderate supply for municipal, industrial, and irrigational uses.

3.17 Water Quality

The surface waters are relatively high in dissolved ions, but they are useful for nearly all purposes. Minnesota River water, if properly treated, is suitable for domestic use. Fecal coliform counts from the Pomme de Terre were far above

the Minnesota Pollution Control Agency standards for safe swimming (Anderson, 1975). Coliform counts in the Lac qui Parle River were also high. The environmental assessment (Anderson, 1975) contains a detailed discussion of surface water quality.

3.18 Lac qui Parle and Marsh Lakes are moderately productive, warm-water lakes. High total phosphate levels, high alkalinity, and moderate nitrate concentrations (Anderson, 1975) support "blooms" of blue-green algae which occur in midsummer.

3.19 Water temperatures up to 27° C (81° F) occur in July (Anderson, 1975). Dissolved oxygen is adequate for fish through most of the summer but may decrease to levels stressful to some fish in certain locations if winds are calm for long periods. Winterkills of fish may occur under ice and heavy snow cover. Prevailing winds usually create enough wave action during open water periods to keep oxygen, temperature, and nutrient levels constant at all depths. The same wind and wave conditions, combined with actions of rough fish, also create highly turbid water by disturbing loose sediments.

3.20 Human activities in the watershed undoubtedly contribute chemicals to the lakes. Pollutants from cropland and livestock operations as well as from municipal wastes are indicated by coliform counts. These substances are either assimilated by the lake biota or flow out of the lakes.

3.21 The water quality of the area wetlands has not been examined. The bottoms are soft muck, high in organic matter, and are easily disturbed by rough fish, cattle, or high winds. Disturbance of sediments and high planktonic populations create turbidity. Agricultural chemicals and animal wastes undoubtedly enter the wetlands through farming operations.

3.22 Groundwater quality is acceptable for domestic, industrial, and agricultural uses. The water from these aquifers is extremely hard, and levels of total dissolved solids, iron, manganese, and sulfate may exceed Minnesota Pollution Control Agency limits (1973) for Class 1-A domestic water supplies. Well water must be treated extensively to be fit for human consumption, and even after treatment, the water retains a harsh mineral taste. Surface sand and gravel aquifers occur irregularly and have high recharge capacity, but are easily contaminated.

3.23 Climate

The climate at Lac qui Parle can be best characterized as mid-continental: hot summers and cold winters. Temperatures at Lac qui Parle average about 43°F, with highs in July and lows in January. Summer highs of more than 90°F are common, but they rarely exceed 100°F. Winter lows below 0°F occur frequently, and lows of -20°F usually occur yearly. The frost-free period is 130 to 140 days. Precipitation averages about 26 inches yearly. Total precipitation may

vary 3 inches within the unit, being less in the west than in the east. Approximately 65 percent of the annual precipitation falls during May and September. Annual snowfall averages about 34 inches. In Swift County, an average of 98 days per year have snow cover of 1 inch or more, with an average depth of 11 inches in March and about 8 inches from December through Marsh (Diedrich et al., 1973).

3.24 Fish and Wildlife Resources

Fisheries

Lac qui Parle Lake is considered a "Warmwater Game Fish Lake" and has maximum and median depths of about 14 to 8 feet (Minnesota DNR unpublished lake survey 1957). Marsh Lake is classified as a "Warmwater Fish and Waterfowl/Aquatic Furbearer Lake" with maximum and median depths of about 5 and 2.5 feet (Minnesota DNR unpublished lake surveys 1953, 1963, and 1968).

3.25 Sixty-four species of fish are known to occur within the project area, including 13 game fish and six commercially-harvested (for management purposes) rough fish.

3.26 Fishing activity occurs on both lakes throughout the year. The predominant species sought are crappies, bullhead, walleye, and northern pike. Fishing activity peaks occur in late spring and fall. Most of the fishing activity occurs below the Marsh Lake Dam, at the Milan Beach Bridge, and below the Lac qui Parle Dam.

3.27 Rough fish harvesting by private contractors is regulated by the Minnesota Department of Natural Resources. During the winter of 1974-75, 150 tons of carp, buffalo fish, and bullheads were harvested.

Wildlife

3.28 Most of Lac qui Parle and Marsh Lakes lie within the Lac qui Parle Wildlife Management Area (WMA) administered by the Minnesota DNR. Immediately upstream is the Big Stone National Wildlife Refuge administered by the U.S. Fish and Wildlife Service. As Plate 1 shows, these wildlife areas plus the Minnesota River Valley form a natural corridor traversing the region from northwest to southeast. This corridor offers an excellent opportunity for viewing, photographing, or enjoying in other ways the wildlife found there.

3.29 Approximately 60 species of birds have been identified in the project area. Of particular note is an island in Marsh Lake that has a breeding colony of white pelicans. Breeding colonies in this area of the United States are considered rare.

Table 2 Average normal temperature, precipitation, and snowfall for the Lac qui Parle WMA vicinity, 1941-1970.

Station	Month J	F	M	A	M	J	J	A	S	O	N	D	Average Normal Total
Artichoke Lake													
Temperature (°F)	10.4	15.1	27.0	44.3	56.9	66.6	72.0	70.4	60.1	49.6	31.5	17.0	
Precipitation (in.)	0.47	0.58	0.97	2.44	3.16	3.97	3.60	3.14	2.32	1.80	0.98	0.57	24.00
Milan													
Temperature (°F)	10.5	15.4	27.5	44.4	56.7	66.4	71.4	69.9	59.4	49.0	31.2	17.0	
Precipitation (in.)	0.65	0.81	1.32	2.53	3.26	4.31	3.33	3.42	2.45	1.70	1.13	0.80	25.71
Montevideo													
Temperature (°F)	11.0	15.4	27.5	44.9	57.3	66.7	71.7	70.0	59.6	49.8	31.9	17.7	
Precipitation (in.)	0.70	0.93	1.44	2.29	3.31	4.72	3.48	3.69	2.92	1.62	1.19	0.84	27.13
Snowfall (in.)	5.7	6.4	8.4	2.5	0.1	0.0	0.0	0.0	T[1]	0.8	7.5	9.0	40.4

1/ Less than 0.05 inches.
Source: Forecast Office, National Weather Service, U.S. Department of Commerce, Minneapolis, Minnesota.

3.30 The ring-necked pheasant is the only upland game bird found in any number within the region. Pheasant hunting accounts for approximately 12 percent of the hunting activity within the project area.

3.31 Waterfowl are probably the most important wildlife species within the area. Waterfowl hunting, in particular goose hunting, accounts for the largest share of the total hunting activity of the area. Waterfowl hunting also has a positive economic impact within the area. The Lac qui Parle WMA has significant waterfowl concentrations during migration periods, in addition to a resident population of Canada geese. In addition to hunting, the WMA offers excellent opportunities for observation and photography.

3.32 Approximately 40 species of mammals are known to occur within the area. Uses include hunting and trapping of a number of the furbearers (fox, muskrat, squirrel) and hunting and viewing of white-tail deer. Deer hunting, both firearm and archery, accounts for 20 percent of the hunting activity in the area.

4.00 MAN-MADE RESOURCES WHICH AFFECT DEVELOPMENT

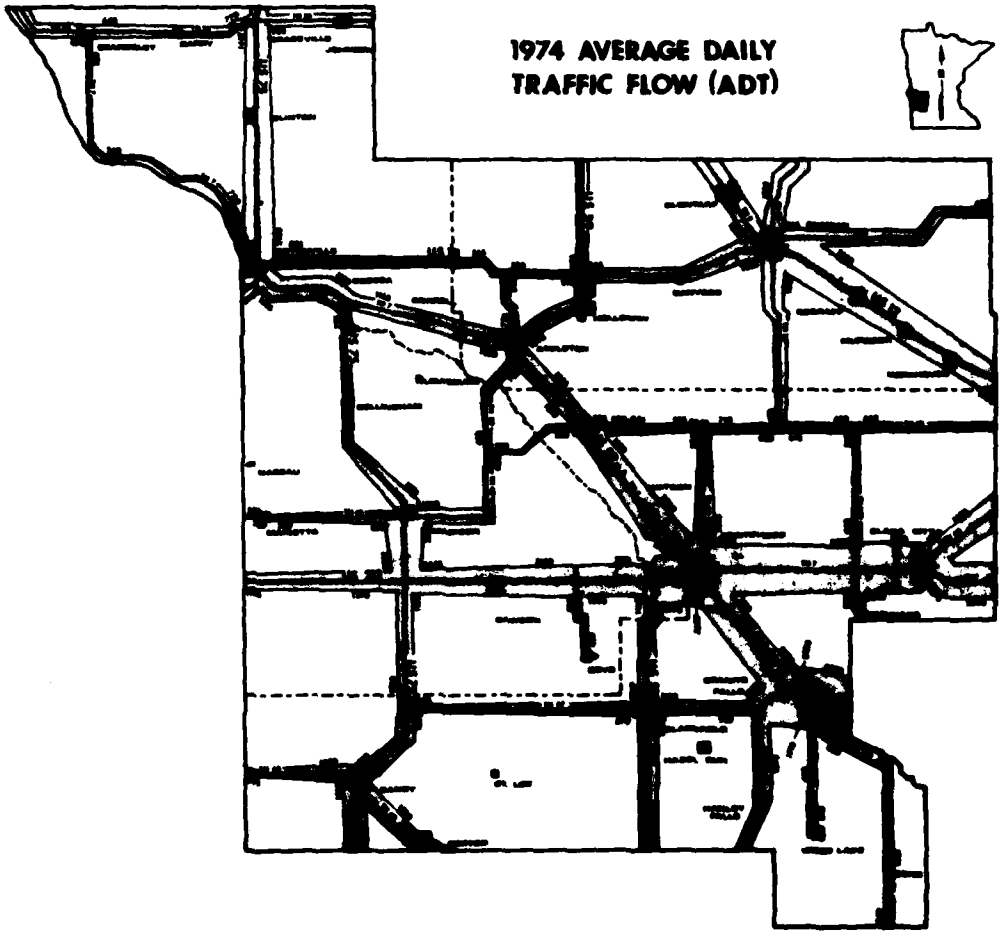
4.01 Accessibility

The project is located about 140 miles west of Minneapolis-St. Paul, Minnesota, about 120 miles south of Fargo, North Dakota-Moorhead, Minnesota, and about 120 miles north of Sioux Falls, South Dakota (see Plate 2). Access to the project area from these metropolitan areas is good via a Federal-State highway system. Commercial bus service links Montevideo to Minneapolis-St. Paul, but there is no direct bus service from the other major metro areas and no regular commercial air or rail service. Within the region, access to the project is via highways and county roads. Figure 1 is a map of the region displaying the traffic volumes on the highway network. Minnesota State Trunk Highways 6 and 40 cross Lac qui Parle Lake, and a township road crosses Marsh Lake near its northwestern end. A public roadway crosses the Lac qui Parle Dam. Marsh Lake has three public accesses, and Lac qui Parle Lake has nine. There is also public access to the Minnesota River between the two lakes.

4.02 There are two access points to the Minnesota River below the Lac qui Parle Dam and Granite Falls. Two more are proposed as part of the management plan for the river (this segment of the river is part of the State-designated Wild and Scenic River System).

4.03 The public accesses are maintained by the Minnesota Department of Natural Resources.

4.04 There are no boat-launching ramps on Corps property, although canoe portages are provided around the dams.



1974 Average Daily
Traffic Flow (ADT)

Figure 1

4.05 Human Resources

History

The area has been used by various human groups from 8,000 B.C. The early users were nomadic hunting groups. Climatic changes brought varying uses or non-uses of the area. Evidence of the users is found only in habitation and burial sites. Our knowledge of these early peoples is very limited.

4.06 In the most recent history of the area, Dakota (Sioux) Indians lived a nomadic hunting and gathering life in the vicinity of Lac qui Parle before white colonization. The Minnesota Valley near Lac qui Parle was probably a focal point of activity because of seasonal abundance of game, shelter from prairie winds, availability of firewood, and easy travel on the lake and river.

4.07 The Lac qui Parle Mission, established in 1836 at the head of Lac qui Parle, was one of the first contact points between white and Indian cultures in western Minnesota. The Treaty of Traverse des Sioux in 1857 was a turning point in white-Indian relations and opened western Minnesota to white settlement pressures from the east. A 10-mile strip along both sides of the Minnesota River from Fort Ridgely to Big Stone Lake was retained by the Dakota in the treaty as a hunting ground. Subsequent sales and encroachments reduced the Indian holding to small areas near Granite Falls and Morton.

4.08 White settlement began after the Dakota were subjugated following the "Massacre of 1862", the last large uprising in Minnesota. Immigrants, mostly Norwegians and New Englanders, first settled near the rivers, near transportation routes, and the timber of floodplain forests.

4.09 In the 1870's, wheat farming began on the region's fertile soils. Buffalo were gone and the drainage of marshes and sloughs began. Cash crops were grown and cattle grazing was common, especially in the western parts of the region, and in the river bottoms and on untillable, rocky soil.

4.10 Cultural Resources

The artifacts and site materials which are the tangible cultural resource base of an area are significant to public use development in two major ways. First, the Corps of Engineers is explicitly responsible for the protection, preservation, and enhancement of cultural resources located within areas of its jurisdiction and impact. Second, cultural resources are literally a resource with development potential. Attending to the first responsibility will often be the first step toward realizing the development potential of the resource base.

TABLE 3 HISTORICAL PERIODS OF LAKE LAC QUI PARLE AREA

Historical Period	Years	Description of Period's Activities
Early Human Period	8,000 B.C. - 5,500 B.C.	Small bands of roving bison hunters utilizing spears and throwing sticks.
Altithermal Event	5,500 B.C. - 3,000 B.C.	Climatic change introducing drought with virtual abandonment of area by people, followed by gradual re-forestation.
Middle Pre-historic Period	3,000 B.C. - 1,200 B.C.	Re-peopling of area by bison hunters likely extending into project areas from the north.
Temporal Hiatus	1,200 B.C. - 500 B.C.	Gap in evidence about human habitation.
Late Prehistoric I	500 B.C. - 500 A.D.	Continuation of bison hunting likely extending into project area.
Late Prehistoric II	Period overlapping previous one to 1,600 A.D.	Increase in population and technology including transition to bow-and-arrow, organized villages and agriculture.
Proto-history	Beginning 1,600 A.D.	Increased use of metal and appearance of the European.
Historical	1,600 A.D. to Present	First Contact: Area mostly used by Algonquian though a good deal of displacement took place through inter-tribal wars. Fur Trade: Establishment of fur trading sites in area by 1823. Nicollet-Fremont expedition in 1839. Pope expedition in 1849. Stevens expedition in early 1850's. The Sioux Wars: Uprisings beginning in 1862 and ending by end of 60's. Modern Transportation and Industry: First steamboat used in area in 1859. Period of developing Scandinavian settlements.

Source: Souris-Red-Rainy River Basin Commission, Souris-Red-Rainy River Basin Comprehensive Study, (Vol. 5), I-62 to I-169.

4.11 A number of cultural resource sites have been located near the project. Among the historical sites are the Lac qui Parle (Dakota) Mission, begun in 1836 near the Lac qui Parle Dam, and the site of Fort Renville, established in 1826. Both are managed by the Minnesota Historical Society.

4.12 Population and Settlement

The entire region has been losing population since 1940. This trend is expected to continue. A big factor in the loss is the population shift from farms and small communities to the larger urban areas. This shift is expected to continue as the economy moves toward non-farm, city employment in agribusiness, manufacturing, and service industries.

4.13 Fifty-three percent of the region's population reside in incorporated municipalities, 15 percent are rural non-farm residents, and 32 percent live on operating farms.

4.14 Economy and Income

Agriculture is the economic base of the region. Farming provides 24 to 33 percent of the jobs in the region. The major crops within the region are corn, soybeans, and small grains. In recent years, there has been a shift away from small grains, toward corn and soybeans.

4.15 There has been an increase in the percentages for the service, clerical, sales, and craftsman categories of employment over the past 20 years. This increase reflects the shift in population discussed previously.

4.16 Tourist and travel-related expenditures comprised about 1 percent of the gross sales within the region.

4.17 While incomes have been rising significantly in monetary terms, real income has not, due to inflation. The median family income declined when compared to the State average from 1940 to 1960, but has been increasing since 1960. In 1975, the median yearly income within the region ranged from $9,400 (Swift County) to $10,000 (Yellow Medicine County). The Statewide median yearly income for 1975 was $14,740 ("1975 Income Estimates," U.S. Department of Housing and Urban Development).

4.18 Institutional Constraints

Various local, State and Federal agencies located in the project area have developed their own ordinances, regulations, and laws. These agencies include local municipalities, the Minnesota Department of Natural Resources, the United States Department of the Interior, and the United States Department of Agriculture. Even though the Corps may not be directly affected by the regulations and ordinances of these agencies, they have been and will continue to be informed of Corps actions to insure that all Corps projects are developed, operated, and maintained in the best public interest.

4.19 Of particular note is the relationship between the Minnesota Department of Natural Resources and the Corps. Both lakes are virtually within the boundaries of the Lac qui Parle Wildlife Management Area. Lac qui Parle State Recreation Area also borders Lac qui Parle Lake. The Minnesota River below Lac qui Parle Dam to Granite Falls is part of the State-designated Minnesota River Wild and Scenic River segment.

5.00 RECREATIONAL DEMAND, SUPPLY, AND NEEDS

5.01 Market Area

The area which provides the majority of visitors to a recreation area is generally referred to as the "market area" or "zone of influence." Specifically, the market area is defined as the area from which 90 percent of the day-use visitors originate. The market area is dependent on the size of the area and the variety of activities offered. Each recreation area has its own unique market area. For a small neighborhood park, the market area may be only a few square blocks, while an area such as the Minnesota Zoological Garden may have a market area 200 miles in diameter. Factors that influence the market area include the types of recreational opportunities provided, the quantity and quality of those facilities, and the proximity of competitive areas.

5.02 The determination of the market area for Lac qui Parle was made by using surveys conducted by the Minnesota Department of Natural Resources (DNR). According to the results of the 1974 State Park Users Survey, 70 percent of the day-use visitors to Lac qui Parle State Recreation Area lived within 50 miles. This finding is supported by a survey conducted as part of the updating process for the 1979 Minnesota State Comprehensive Outdoor Recreation Plan (SCORP). Survey respondents indicated a willingness to travel 53 and 32 miles for fishing and picnicking, respectively. The State recreation area offers a wider range of day-use recreational opportunities than the Corps areas (swimming and boat launching in addition to bank fishing and picnicking) and is much larger. Therefore, the average market area for the Corps areas would probably be somewhat less than for the State recreation area. It is assumed the market area for Lac qui Parle is approximately 50 miles in diameter.

5.03 In the early 1970's, the Minnesota State Legislature authorized the establishment of Regional Development Commissions (RDC's) as advisory/planning units. The RDC's are to develop various comprehensive regional plans, stimulate local planning, and provide technical assistance to local units of government. Many statewide plans are organized according to RDC divisions.

5.04 The Lac qui Parle project lies within the Upper Minnesota Valley Regional Development Commission (UMVRDC) area (Region 6W). The UMVRDC includes five counties, all bordering the project: Big Stone, Chippewa, Lac qui Parle, Swift, and Yellow Medicine. The entire region is within 50 miles of the Lac qui Parle project.

5.05 Based on the above information, the market area for the Lac qui Parle project is assumed to be Region 6W.

5.06 The existing recreational conditions within the market area must be examined to assure that the project is attempting to meet the recreational needs of its market area. The following sections will examine the existing supply plus the documented and perceived deficiencies (needs) of the area.

5.07 Demand

The analysis of the recreational demand of the market area is based upon the perceived public needs for fishing and picnicking as expressed in the survey conducted for the 1979 Minnesota SCORP.

5.08 The SCORP surveys asked respondents which recreational activities should have more opportunities for participation ("We want more of ..."). Respondents were then asked to rank the various needs (more opportunities) from high to low. Residents of the Lac qui Parle project market area most often wanted increased fishing opportunities, although this did not receive a very high "need" rating. These results could indicate that, while many residents want more facilities related to fishing (i.e., accesses, fishing piers, etc.), they do not perceive as great a "need" for such facilities as they do for those supporting other types of recreation. They probably believe other recreational opportunities should be developed before more fishing accesses, etc.

5.09 Picnicking ranked low in both the percentage of residents wanting more opportunities and the expressed level of need. An interpretation of this data indicates that the residents do not perceive a shortage of picnicking areas or crowding at these areas and do not place a high priority on developing additional areas. Again, there are other things they would rather have.

5.10 There are some differences between the regional data and the statewide data. A greater percentage of residents of Region 6W wanted more fishing opportunities than the statewide average, even though they gave it the same level of "need". Picnicking ranked much lower in both categories in Region 6W than statewide.

5.11 In addition to asking residents what they wanted, the SCORP surveys also asked where the residents recreated. The responses were compiled by regions. The data provide estimates of the total recreation activity occasions originating and occurring within a particular region by activity type. Thus, the data yield interregional recreation flows.

5.12 A review of the data on fishing in Region 6W indicates that approximately one-half of the residents fish within the region and that the majority of those who leave the region go north to Region 4, known for its lakes, resorts, and vacation homes. Residents account for approximately 65 percent of the fishing occurring within the region. Although the average willingness to travel for fishing from the Minneapolis-St. Paul metro area (Region 11) is 82 miles, 12 percent of the non-resident fishing occurring within Region 6W is from the metro region, a distance of approximately 130 miles.

5.13 Approximately 56 percent of the residents do their picnicking within the region, with the majority of those who leave traveling into the regions to the north (Region 4) and east (Region 6E). Almost three-fourths of the picnicking that occurs within the region is done by regional residents.

5.14 The various recreational activity occasions were projected by region through 1995. The Minnesota State Demographer's Office has projected the population in Region 6W to decline approximately 2½ percent by 1995. The picnicking occasions generated by the residents are also expected to decline, with the per capita use rate remaining relatively constant (2.4 occasions per capita). Picnicking occasions will decline 4.6 percent by 1995. "Activity occasion" is defined as a person engaging in a recreation activity such as swimming for a reasonable portion of a day. Per capita use rate is the number of times, on the average, each person within a particular area will participate in a recreational activity.

5.15 During this time period, fishing occasions are expected to decline through 1985, but then begin to increase to a level 2.3 percent higher in 1995 than in 1980. The per capita use rate in 1980 is estimated at 3.54; in 1995, at 3.73.

5.16 It must be noted that the summer activity surveys were conducted during 1978. Beginning in 1979, the cost and availability of gasoline has impacted recreation travel. The long-range effects of increased cost and limited availability have yet to be determined.

5.17 Supply

In general, the distribution of outdoor recreation facilities is relatively uniform for the counties east and west of the Minnesota River (see Table 4). The three eastern counties - Big Stone, Chippewa, and Swift - account for 22 to 25 percent each, or about 70 percent of the total. (Those three counties contain approximately 60 percent of the population.) Lac qui Parle County contains 17 percent of the facilities and Yellow Medicine 13 percent. Big Stone County has almost twice its share of facilities while Yellow Medicine has about half its share (comparing percent of regional population and percent of facilities). Big Stone's western border is Big Stone Lake, and the county provides more than 60 percent of the region's water-based recreational opportunities at resorts, marinas, and beaches. Yellow Medicine County has a lack of water-oriented recreational resources.

TABLE 4 DISTRIBUTION OF RECREATIONAL FACILITIES BY COUNTY

Facility Type (Number/Percent)	County					
	Big Stone	Chippewa	Lac qui Parle	Swift	Yellow Medicine	Total
Parks	3/5.4	18/32.1	10/17.9	15/26.8	10/17.9	56
Resorts	6/66.7	2/22.2		1/11.1		9
Campgrounds	5/27.8	4/22.2	4/22.2	5/27.8		18
Marinas	6/66.7	2/22.2		1/11.1		9
Athletic Fields	5/10.2	10/20.4	9/18.4	16/32.7	9/18.4	49
Water Accesses	17/34.0	7/14.0	9/18.0	11/22.0	6/12.0	50
Swimming Beaches	6/60.0	2/20.0	1/10.0		1/10.0	10
Swimming Pool	1/14.3	1/14.3	2/28.6	2/28.6	1/14.3	7
Total Facilities	49	46	35	51	27	208
Percent	23.6	22.1	16.8	24.5	13.0	
Percent of 1970 Regional Population	12.9	24.4	18.1	21.3	23.3	

5.18 Four State parks and seven county parks lie within the region. Their locations are shown in Figure 2, and their facilities are listed in Table 5.

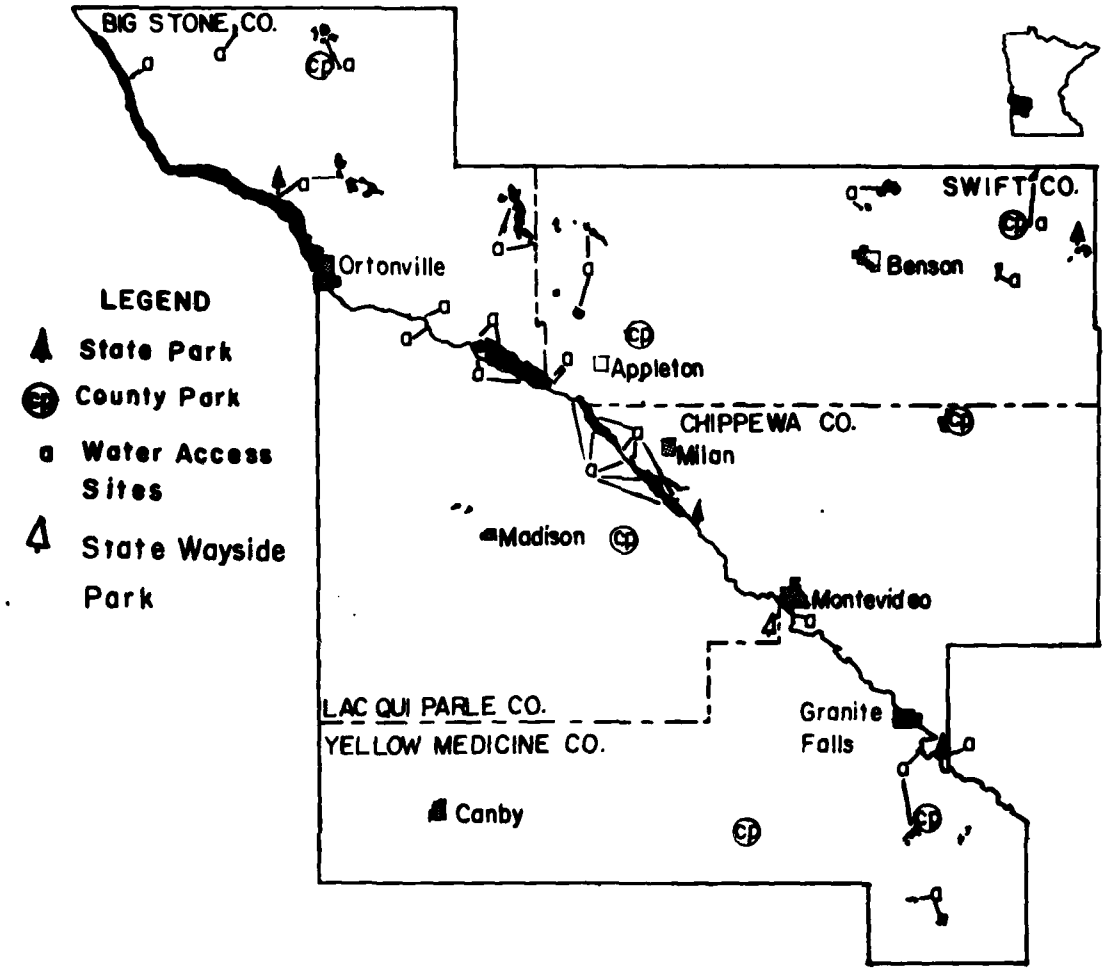
5.19 The various municipal parks and school playgrounds serve an important function in providing recreation and open space areas. Such areas often include facilities for a variety of field and court games, as well as picnic facilities.

5.20 Other important components of the open space system are the federally-controlled Wildlife Production Areas (WPA) and Wildlife Refuges plus the State-owned Wildlife Management Areas (WMA) and Wildlife Refuges. These wildlife areas account for approximately 3 percent of the land use within the region. While these areas are managed for wildlife values rather than recreation, they do provide wildlife-oriented recreational opportunities such as hunting, wildlife observation, and aesthetic enjoyment.

TABLE 5 FACILITIES
AT STATE AND COUNTY PARKS
WITHIN REGION 6W

Units	Facilities						
	Camp Sites	Picnic Tables	Restrooms	Shelters	Water	Beach	Trails
State Parks							
Lac qui Parle S.P.	56	100	Y	2	Y	Y	Y
Upper Sioux Agency S.P.	35	41	Y	0	Y	N	Y
Big Stone Lake S.P.	42	60	Y	0	Y	N	Y
Monson Lake S.P.	20	48	Y	1	Y	Y	Y
County Parks							
Lac qui Parle C.P.	0	6	Y	1	Y	N	N
Chippewa C.P.	0	24	Y	1	Y	N	N
Toqua C.P.	0	32	Y	1	Y	Y	Y
Swift Falls C.P.	0	13	Y	4	Y	N	Y
Appleton C.P.	0	12	Y	3	Y	N	Y
Oraas C.P.	0	3	Y	0	Y	N	N
Wood Lake C.P.	0	10	Y	1	Y	Y	N

Y = Yes N = No



Parks and Water Access Sites

FIGURE 2

5.21 Needs

The 1976 Basic Data for Regional Comprehensive Plan prepared by the Upper Minnesota Valley Regional Commission calculated the deficiency/surplus for various categories of park lands, but not for specific opportunities, such as camping or picnicking. The standards used were based on acres per resident and distances (service radius).

5.22 There are no regional parks within Region 6W. Based on the standards of the Regional Plan, there should be one regional park of approximately 640 acres serving the regional residents. A central location would be preferred.

5.23 While a number of county parks with sufficient acreages are available to serve the populations of the counties, some areas lie beyond the service radii of the parks. In particular, much of the eastern side of the Lac qui Parle project is beyond the service radii of the county parks.

5.24 The 1979 Minnesota SCORP did not calculate demand, supply, and needs in the traditional format. The demand and needs portions are provided in the format as described above. The supply portion is presented separately, in an inventory format. No capacity estimates were developed.

5.25 Site-Specific Demand

Visitation to the Lac qui Parle project increased approximately 10 percent from 1977 to 1978. The 1979 visitation was down somewhat, due in part to high reservoir levels which forced the State Recreation Area to close during portions of its major visitation season (Table 6).

5.26 Based on the data contained in the 1979 Minnesota SCORP, fishing and hunting will continue to be a major attraction for the entire project area. Fishing should continue to account for the majority of the visitation at the Corps areas.

5.27 Facility Requirements

The major uses of the Corps areas currently are fishing and picnicking. The facilities needed to support these two activities include parking areas, picnicking units, and restrooms. The facilities required to support these activities adequately can be calculated from the existing visitation. These calculations are based on the following assumptions:

a. 50 percent of the visitation occurs during the peak of the recreation season (May, June, and July)(12 weeks).

b. 60 percent of the visitation occurs on weekends.

c. The turnover factor for these activities at this project is three.

d. There is an average of 3.2 persons per vehicle.

TABLE 6 VISITATION TO THE LAC QUI PARLE PROJECT

Year	Corps Areas		Lac qui Parle State Rec. Area			Other Areas	Project Total
	Lac qui Parle	Marsh Lake	Day Use	Camping	Total		
1977	84,000	19,900	62,220	13,811	76,031	68,869	248,800
1978	81,900	23,600	63,965	15,182	79,147	91,753	276,400
1979	81,900	23,600	30,633*	4,671*	35,304*	135,396	276,200

*Closed for 70 days during visitor season due to high water.
From: Recreation Resource Management System, and the Minnesota Department of Natural Resources

5.28 The facilities required to support recreational activities are generally based on the design day. The design day is defined as an average weekend day during the height of the recreation season. Given the above assumptions and the 1979 visitation at the Lac qui Parle Recreation Area, the visitation on the design day is calculated as follows:

> Design Day = Annual Visitation X percent during peak season X percent on on weekend day/number of weeks during season
>
> For Lac qui Parle, the calculation is:
>
> Design Day = 81,900 X 0.50 X 0.30/12 = 1,023.75

Therefore, on an average Sunday during May through July, approximately 1,024 people could be expected to visit the Lac qui Parle Recreation Area.

5.29 Given a turnover factor of three for the site, the instant design load (the number of people on the site at a given time during the day) is 341 (1,024÷3) people. Given an average "carload" of 3.2 persons, 107 parking spaces are required. About 25 percent of the visitors to the project picnic during thier stay. Assuming that each carload of picnickers requires a picnic table, 27 tables would be needed (107 X .25).

5.30 Standards for sanitary facilities in picnic areas indicate that, based on the area's visitation, the restrooms should provide 4 stools/2 stools - 2 urinals for women and men, respectively.

5.31 Table 7 lists the current demand, supply, and needs for these facilities at the Lac qui Parle and Marsh Lake recreation areas.

5.32 Projected Future Visitation

The projected visitation was based on the following assumptions:

> The future demands for recreational opportunities will increase/decrease as projected in the Minnesota State Comprehensive Outdoor Recreation Plan. The project will continue to attract its "share" of the recreational activity occasions in the region.

As stated earlier, by 1995 the demand for fishing is expected to increase 2.3 percent over the 1980 levels while picnicking is expected to decline by 4.6 percent. The future demand can be projected by applying these percentages to the existing visitation. To project the increases due to fishing, it is necessary to determine that portion of the overall visitation attributable to fishing and then to apply the percentage increase:

TABLE 7 PRESENT AND FUTURE RECREATION FACILITY REQUIREMENTS

	Total Annual Visitation	Design Day Visitation	Instant Design Load	Parking Spaces			Picnic Units			Sanitary*		
				Demand	Supply	Needs	Demand	Supply	Needs	Demand	Supply	Needs
	Present Facility Requirements (1979)											
Lac qui Parle	81,900	1,024	341	106	102	4	26	30		4/2+2	2/1+2	2/1+0
Marsh Lake	23,600	295	98	31	59	--	8	0	8	3/1+1	2/1+1	1/0+0
	Future Facility Requirements (1995)											
Lac qui Parle	83,000	1,038	346	108	102	6	27	30		4/2+2	2/1+2	2/1+0
Marsh Lake	24,000	300	100	31	59	--	8	0	8	3/1+1	2/1+1	1/0+0

*Sanitary requirements expressed as stools (women)/stools and urinals (men)

Total visitation X percent fishing X percent increase = Increase due to fishing.

81,900 X .70 X .023 = 1,318.59, or approximately 1,300.

Similarly, the decrease in visitation due to the decline in picnicking can be determined:

81,900 X .25 X .046 = 941.85, or approximately 940.

Therefore, the projected visitation in 1995 for the Lac qui Parle Recreation Area is:

81,900 + 1,300 - 940 = 82,260.

The future visitation at Marsh Lake can be calculated in the same manner. For the purposes of determining the facilities required to provide for the needs of the visitors as well as to protect the resources, the 1995 visitation at Lac qui Parle can be assumed to be 82,000, and at Marsh Lake, 24,000 visitors.

5.33 Table 7 lists the projected facility requirements for the Corps areas at the Lac qui Parle project.

6.00 SITE DESCRIPTION AND EVALUATION

The purpose of this section is to describe the existing conditions at the Corps-administered areas and to evaluate the resource capabilities at those areas.

6.01 Land Use Allocations

The lands that the Corps acquired at the project were those areas needed for project operations (see Project History, paragraph 2.04). Subsequently, the use of the Corps lands has been allocated into four categories: Project Operations; Recreation-Intensive Use; Recreation-Low Density; and Wildlife Management (see Plate 2).

6.02 Project Operations lands are defined as those lands acquired and allocated to provide for safe, efficient operation of the project. At the Lac qui Parle projects, approximately 4 acres have been allocated to Project Operations. These lands include parts of the impounding structures and the Corps maintenance area near the Chippewa River diversion structure.

6.03 Recreation-Intensive Use lands are defined as those lands acquired for project operations and allocated for development as public use areas for intensive recreational activities. Areas for intensive recreational activities include swimming beaches, campgrounds, and picnic areas. Ten acres are allocated for this purpose (seven at Lac qui Parle and three at Marsh Lake).

6.04 Recreation-Low Density lands are those project operation lands that are allocated for public use areas for extensive recreational use. Extensive recreational activities generally require large land or water areas with a minimum of development. Typical activities/uses include hunting, hiking, and primitive camping; 139 acres at the Lac qui Parle project are allocated in this category.

6.05 Wildlife Management lands are those lands acquired for project operations and allocated as habitat for, or propagation of, fish and wildlife species. The Minnesota Department of Natural Resources leases 347 acres for fish and wildlife purposes.

6.06 The remaining 78 acres of the 578 acres administered by the Corps at the Lac qui Parle project are permanently flooded and are not included in the land use allocations.

6.07 Descriptions and Evaluations

Marsh Lake Recreation Area (Plate 3)

This recreation area of approximately 3 acres, located on the east downstream side of the dam, is considered fully developed. Facilities consist of a gravel parking lot, a vault restroom, and a bulletin board. The predominant use of the area is bank fishing, followed by wildlife observation/sightseeing.

6.08 The area is virtually level. The parking area is approximately 5 feet above the tailwater elevation. Much of the surrounding land is lower, and often is wet. The shoreline is riprapped. Access to the water's edge is not difficult due to the gradual slope and small stone size.

6.09 The vault restroom is relatively new. It is well sited on the southeast corner of the area on a small mound. Its design and well maintained appearance result in a relatively vandal-resistant structure.

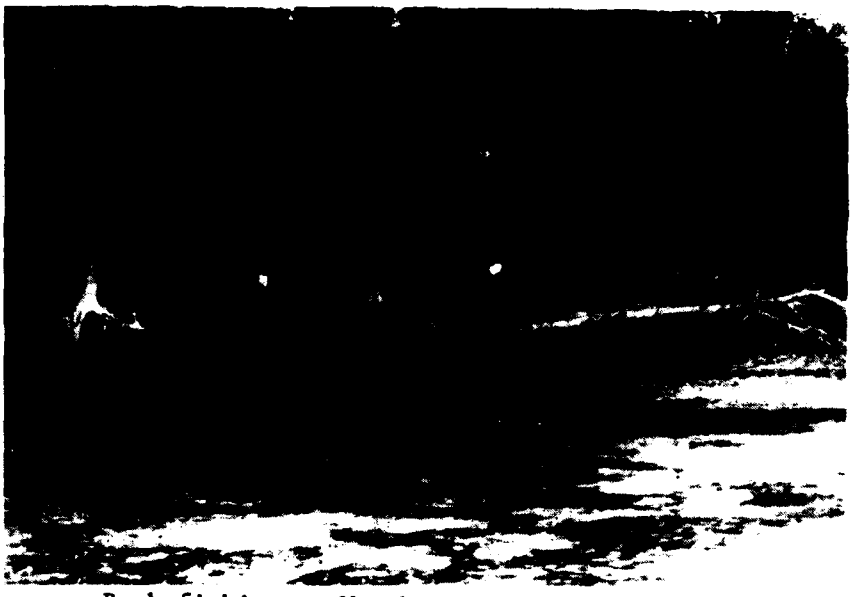
6.10 Local individuals have expressed a desire to obtain vehicle access to the west side of the dam for fishing. Although the road has been gated in the past, people drove around it and along the dike to get closer to the dam. It is virtually impossible to restrict access to this area. Currently, no facilities on the west side of the dam support recreation.

6.11 The only problem noted is the occasional "beer party" which results in large amounts of litter and bonfire remnants. The area is relatively remote and therefore very attractive for such parties. There seems to be little that can be done to solve this problem.

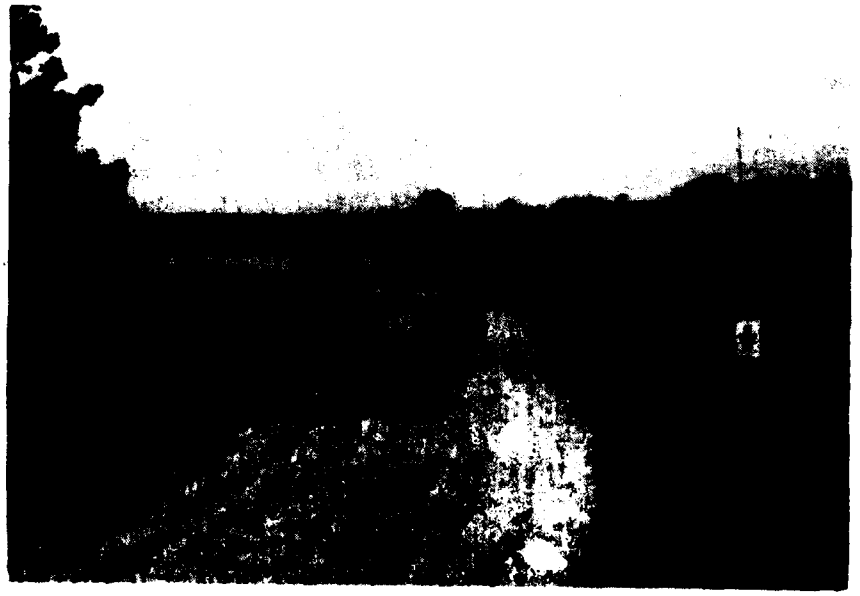
Aerial view, Marsh Lake Recreation Area.

White pelicans feeding below Marsh Lake Dam.

Bank fishing at Marsh Lake Recreation Area.



Bank fishing at Marsh Lake Recreation Area.



Gate controlling access to the west side of Marsh Lake Dam. Fish-rearing pond is in background.

6.12 Lac qui Parle Recreation Area (Plate 4)

Developed recreation sites are located on both sides of the river, downstream of the dam.

6.13 The site on the east bank is oddly shaped, and contains a paved parking lot and a few scattered benches. A few scattered trees are also on the site. The predominant recreational use of the site is bank fishing. The site is visually dominated by the parking lot.

6.14 The site, which is nearly level, is about 15 feet above the tailwater in the vicinity of the dam. The shoreline is riprapped and is rather steep. As can be seen in the accompanying photograph, the riprap rock is not very large, and people can climb down to the water's edge for fishing. Beyond the limits of the riprap, the difference in elevation between the parking area and the water is less than it is upstream. Paths have developed to the shoreline, creating areas of easier access (see photograph). The Minnesota Department of Natural Resources (DNR) had "developed" the downstream end of a canoe portage around the dam in this area.

6.15 Immediately to the east, the land is farmed. The boundary between Corps property and the farm field is delineated by the end of mowed grass on Corps property and the beginning of the field crops.

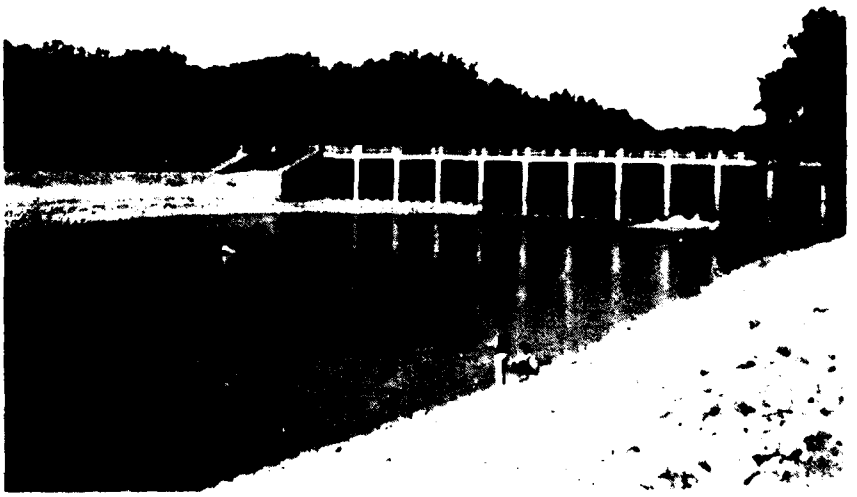
6.16 The west bank site differs in many ways from its neighbor across the river. Although, like the east bank site, it is nearly level and about 15 feet above the river, the similarity ends there. Much of the site has a dense overhead canopy with minimal undergrowth. The roadway and parking area are gravel. Facilities include vault restrooms, picnic tables, fire grates, benches, play equipment, and a fish-cleaning area. This site is much larger than the east bank site and has a definite park-like atmosphere.

6.17 The west bank site includes a 1.67-acre parcel leased from the Minnesota DNR (see Plate 2). The purpose of the lease is to allow greater access to the river. The current lease expires in April 1984.

6.18 At the west bank site, the shoreline is very similar to the east bank. Immediately adjacent to the dam is hand-placed, grouted riprap. Hand-placed riprap forms the upstream half of protected bank. The downstream half is randomly-placed stone. The hand-placed riprap has a very smooth surface which is difficult to traverse, and therefore it limits access to the water. Downstream of the riprap, the bank is very steep and, in some places, is eroding. Unlike the east bank, there is not "easy" shoreline access.

6.19 Direct access to the tailwater is provided by a stairway located on the downstream end of the west abutment. The dam apron follows a stairstep design from the west to the east, and is accessible from the stairway. The result is that fishermen can get very close to both the water and the gates that are discharging.

Sign located at Lac qui Parle Recreation Area, west bank area.



Bank fishing at Lac qui Parle Recreation Area, east bank.

Views of the parking area, east bank, Lac qui Parle.

End of riprapped shoreline, east bank, Lac qui Parle. Note the change in grade leading to the water. The area is the downstream end of the designated canoe portage.

Portage sign, east bank, Lac qui Parle.

Views within the west bank area, Lac qui Parle.

Views within the west bank area, Lac qui Parle.

West bank, Lac qui Parle. Note the smooth surface of hand-placed riprap. The area in this photo is the most heavily used portion of the recreation area.

View of the west shoreline, downstream of Lac qui Parle Dam. Note the stairway down to the dam apron and the smooth surface of the riprap.

View of the west shoreline, downstream of Lac qui Parle Dam. Note the change between the hand-placed riprap and the randomly-placed riprap.

View of the west shoreline, downstream of Lac qui Parle Dam. Note the bank beyond the riprap.

Gravel parking areas. Note the lack of controls to establish parking pattern.

Decomposing carp.

Vault restrooms, Lac qui Parle Recreation Area.

6.20 The largest recreational use of this site, as at all sites on the project, is bank fishing. However, at the west bank, fishing is often combined with picnicking. Indeed, the most popular portion of the site is the picnic area between the road/parking area and the river. Most of the picnic tables are located in this area.

6.21 In addition to bank fishing, many people fish from the downstream side of the bridge over the dam. While a nearly 6-foot-wide walkway is on the upstream side, there is no walkway on the downstream side. The roadway is 23 feet wide; by current standards it is rather narrow. The average daily traffic (ADT) in 1979 was 400 vehicles (source: Minnesota Department of Transportation). No signs prohibit fishing from the structure, nor do local officials believe that such signs would be effective. This is, however, a dangerous situation that needs to be corrected. The two counties which "share" the bridge, Chippewa and Lac qui Parle, are considering widening the bridge, but have developed no plans to date.

6.22 The only noted problem at the Lac qui Parle areas is the parking lot on the west bank. Because there are no delineated parking spaces, the first few vehicles to park determine the pattern and thus the potential capacity of the lot. One solution is to pave and stripe the parking lot.

6.23 Both sites at Lac qui Parle Dam are well maintained.

6.24 One problem that occurs throughout the project area is the disposal of dead carp. Minnesota fishing regulations prohibit fishermen from returning rough fish to lakes or rivers after they have been caught. During the spring, carp congregate below the dams and are relatively easy to catch. Because the usual method of disposal of this rough fish is to leave them along the shore, a large number of carp accumulate along the shore, in the bays of the structure above the tailwater, and in trash cans. Unless the dead fish are removed virtually daily, they begin to decompose and smell. Due to current workforce constraints, the Corps is unable to remove the dead fish as often as it would like. No easy solution to this problem is apparent.

6.25 Potential for Future Development

The Corps lands available for recreation at this project are extremely limited because they are considered fully developed in terms of recreational opportunities provided. Changes in the existing developments can and should be made to maintain and improve the existing conditions.

7.00 RESOURCE USE OBJECTIVES

7.01 The Corps of Engineers defines resource use objectives as "clearly written statements, specific to a given project, which specify the attainable, publicly acceptable options for resource use determined from study and analysis of resource capabilities and public needs (opportunities and problems)." [1]

1 Engineer Regulation (ER) 1105-2-167, Resource Use Objectives, Paragraph 4.2.

7.02 These objectives are based upon the expressed desires of the public served, within the capabilities of the natural and man-made resources of the specific project.

7.03 Public Needs

Results of a statewide recreation survey conducted by the Minnesota Department of Natural Resources (MDNR) indicates a need for increased fisheries management and public fishing accesses in the region. There is also an expressed need to develop additional swimming, bicycling, camping, and hiking facilities. The State Comprehensive Outdoor Recreation Plan (SCORP) recommends that State and Federal agencies expand their programs to provide increased hunting opportunities.

7.04 A public workshop was held at Lac qui Parle to obtain the views of local residents on public use at the project. Much of the discussion centered on fishing accesses and fisheries management (see Exhibit 1, Public Workshop Comments). In particular, the residents expressed a desire for access to the west side of Marsh Lake Dam. Also, they believe that the various agencies responsible are not doing enough to manage the lakes to their full potential for fishing. The residents voiced concerns about the current Corps operating plan and its effects on the fishery. (As a result of the workshop and letters from a local resident and the Department of Natural Resources, the St. Paul District has initiated a review of the current operating plan.)

7.05 Resource Capabilities

An examination of Corps-administered lands at the Lac qui Parle project indicates that the current allocation of those lands is providing protection for the resource as well as accommodating the recreational needs of the public. With some modifications, the existing recreational developments can support the current and projected use. The existing facilities need to be modified to provide for greater visitor safety and ease of operation.

7.06 Statement of Objectives

Based upon the public inputs, identified capabilities of the project resources, and professional judgment, the following resource use objectives for the Lac qui Parle project have been developed:

1. To provide quality day-use recreational opportunities that will help meet the recreational needs of the region.

   The project currently provides opportunities for hunting, fishing, picnicking, and other day-use activities. These opportunities should continue to be provided. Changes in the existing allocation of project resources would not significantly increase the benefits derived from the project. Therefore, the existing management policies should continue in effect, and efforts should be made to protect the ability of the resources to provide day-use recreational opportunities.

2. To improve existing facilities by making them safer and more accessible to the public.

Wherever necessary, facilities should be constructed or modified to improve accessibility and reduce existing or potential safety problems. Examples include traffic circulation problems at the Lac qui Parle Recreation Area during high use periods, and the lack of sanitary facilities on the east bank - a potential public health problem. Improving accessibility to these areas for the handicapped will also make the areas less congested and safer for the entire public.

8.00 PLAN OF DEVELOPMENT

8.01 The changes and improvements proposed in this section are based on the resource use objectives, the projected public use of the areas, and the ease of operations and maintenance.

8.02 Land Use Allocations

The existing land use allocations as described earlier (paragraphs 6.01 through 6.06) will remain unchanged. An analysis of the resources and current management indicates that the existing allocations meet the established resource use objectives, and no changes are required.

8.03 Signage

The Minnesota Department of Transportation (MNDOT) is replacing the existing metal project signs along the State Highways with standardized brown/with white lettering recreation area signs. This action is part of a systematic long-term MNDOT effort to upgrade their signs throughout Minnesota. The signs are erected by the State at no charge to the Corps, which can recommend additional locations for signs. The replacement of existing signs is accomplished as part of the regular sign replacement schedule.

8.04 The existing signage within the recreation areas is adequate and conforms to the guidelines contained in the NCD Sign Handbook (NCDP 1130-2-1, 20 December 1974). Additional project signs are needed at Marsh Lake and the east bank area at Lac qui Parle. These signs should be similar to the signs in the west bank area at Lac qui Parle.

8.05 Plantings

Planting of trees and/or shrubs will be necessary to replace existing vegetation when necessary and to establish buffer/screen areas, shade trees, etc. These plantings are needed to maintain existing conditions, to provide additional shade for the visitors' comfort and safety, to establish the boundaries of the recreation areas, to ease visitor control, and to reduce project operations and maintenance costs. Table 8 lists recommended trees and shrubs to be used at the Lac qui Parle project.

TABLE 8
RECOMMENDED PLANT LIST

Common Name	Botanical Name
Trees	
*Soft Maple	Acer saccharinum
Box Elder	Acer negundo
*Green (Red) Ash	Fraxinus pennsylvanica
Basswood	Tilia americana
Bur Oak	Quercus macrocarpa
*Swamp White Oak	Quercus bicolor
*Cottonwood	Salix alba
*River Birch	Betula nigra
Small Trees and Shrubs	
Prairie Crab Apple	Malus ioensis
*Red-osier (-twigged) Dogwood	Cornus stolonifera
Pin Cherry	Prunus pennsylvanica
Choke Cherry	Prunus virginia
*Honeysuckle Zabel	Lonicera bella
Common Lilac	Syringa vulgaris
Fragrant Sumac	Rhus aromatica
*Pussy Willow	Salix discolor

*Suitable for use in low areas, e.g., Marsh Lake Recreation Area

8.06 Dutch elm disease and oak wilt have claimed many trees in the past few years, and these losses will continue. Diseased trees on Corps property should continue to be removed and properly disposed of as part of the ongoing maintenance program. In areas where the removed trees or shrubs provided significant shade and/or aesthetic values, they should be replaced. Replacements shall be from those species listed in Table 8 and should provide those values being lost.

8.07 All planting described within this report and all subsequent planting should be coordinated between the field and the District Office, utilizing the appropriate disciplines (landscape architects, foresters, botanists, resource managers, etc.).

8.08 Interpretive Program

The purpose of the interpretive program is to provide visitors with information on the Lac qui Parle project and to locate other recreation areas and points of geologic and historic interest. An interpretive display will be located adjacent to the dam structure at each recreation area. These displays will contain information about the Lac qui Parle region and the role of the project in controlling floods.

8.09 Sanitary Facilities

A relatively new vault restroom is located at Marsh Lake. Additional facilities are calculated to be needed at this recreation area, but costs and use figures indicate that providing additional facilities does not appear to be justifiable.

8.10 The existing restrooms on the west bank area at Lac qui Parle are metal structures that will need to be replaced when they "wear out." It is recommended that they be replaced with a structure similar to the one at Marsh Lake. If possible, the existing vaults should be utilized.

8.11 No facilities are located on the east bank of Lac qui Parle. Based on existing site use, sanitary facilities should be provided for public health and safety reasons, although there is some question as to whether the use at this particular site would be sufficient to justify the expense of providing a vault restroom similar to the one located at Marsh Lake at an estimated cost of $35,000. As an interim solution, a portable restroom should be provided. The use can then be monitored, and a determination can be made about providing a permanent structure. The existing need for sanitary facilities at the Lac qui Parle Recreation Area should be met on this side of the river.

8.12 Sanitary dumping stations for self-contained travel trailers, motor homes, and campers will not be provided. This is in keeping with the current management policy of providing day-use-only facilities.

8.13 Handicapped

Currently the recreation areas are not fully accessible to handicapped persons. The two major recreational activities, picnicking and fishing, were examined to determine what actions could be taken to enhance their accessibility.

8.14 The first barrier often encountered by handicapped visitors is the availability of adequate parking space. There are no parking spaces specifically designed or designated for handicapped visitors in the recreation area parking lots. Current design standards require designated parking spaces that are a minimum of 12 feet wide and level and that have a surface sufficiently stable to support wheelchairs. A minimum of two designated spaces should be available in each of our lots. The surface should be either asphalt or compacted crushed rock.* These spaces should be close to the activity areas.

8.15 All activity areas within the recreation areas should be accessible. Paths from the parking areas to and between the picnic areas and restrooms will be asphalt or compacted crushed rock, as appropriate.

8.16 The restrooms should also be accessible. Entrances should be at grade or ramped to provide access for those visitors confined to wheelchairs. Grab rails, etc., should be provided wherever possible within the restrooms.

8.17 The existing picnic tables are usable by handicapped persons. Their utility for wheelchair use can be made more functional by removing the ends of the benches at one end of the table. Also, when new tables are assembled, the supports can be placed closer together, increasing the usable area. At least two picnic units per area should be placed on compacted crushed rock or asphalt pads for use by wheelchaired visitors.

8.18 A wooden fishing platform is proposed for the Marsh Lake Recreation Area. The platform would be approximately 50 feet long, 8 feet wide, and 4 feet above the normal tailwater elevation. Constructed over the water on wooden or metal pilings, this platform would be connected to the shore beyond the riprap by a walkway/bridge approximately 50 feet long. The platform will be designed to be completely accessible to handicapped visitors.

8.19 Because of the difference in elevation between the tailwater and the main recreation areas at Lac qui Parle, it would be very difficult and expensive to develop a similar fishing platform. Efforts to provide for fishing opportunities for handicapped persons should be directed toward a walkway on the downstream side of the bridge, if and when a new bridge is constructed.

8.20 All areas and facilities will be appropriately signed to indicate their accessibility by handicapped persons.

*The Minnesota Department of Natural Resources has used compacted crushed rock for trail surfaces with good success. The surface material is a "three-eighths minus" crushed limestone (all particles are three-eighths inch diameter or smaller). Their success results from good initial compaction and adequate surface drainage.

Site-Specific Developments

8.21 Marsh Lake Recreation Area

The gravel parking lot dominates this site. Based on the facilities required to meet the current and projected parking needs, the area has an excess of parking spaces but a need for picnicking units. Therefore, the proposed plan is to reduce the dominance of the parking lot, both physically and visually, and to increase the area available for picnicking.

8.22 To utilize the existing parking area as much as possible; to maintain good traffic flow within the area; and to create a "desirable" picnicking area, were among the design considerations used in redeveloping the area. Because most people prefer to be adjacent to the water, it was decided to "pull" the parking lot away from the river, thereby creating more user space between the lot and the river. A number of different traffic flows and parking patterns were considered. Ninety-degree parking angles, except for the three 45-degree car-trailer spaces, were used because this angle provides more parking spaces per unit of area. In addition, it facilitates better traffic circulation within the parking lot.

8.23 Inset 1, Plate 5, depicts the proposed changes to the area. The number of parking spaces would be reduced from 59 to 44. As a result, the area of land available for visitor use nearly doubles. While two of the remaining parking islands will be reduced in area, three additional islands will be created. All the islands will be sodded and planted with trees and/or shrubs. The planting will aid in visually breaking up the size of the lot and provide shade. Although the lot will remain gravel/crushed-rock-surfaced, the area of the parking lot that is abandoned would be stripped of its gravel surfacing (to be salvaged and reused) and replaced with topsoil and sodded. Trees and shrubs would also be established in this area to create a park-like atmosphere and to provide shade for the users and the parking lot. Research has indicated that areas that are pleasing to the user require less maintenance. Therefore, the additional planting should reduce overall maintenance costs. Ten picnic units, two tables on hardened pads for handicapped visitors, will be provided. Benches will also be provided (see Table 9 for Cost Estimate).

8.24 As described earlier, a fishing platform will be provided.

8.25 The local residents have expressed their desire for vehicle access to the west side of Marsh Lake Dam. There are a number of constraints in providing public access. The earthen dike is only approximately 20 feet wide at the top with a 10-foot-wide roadway. The purpose of the roadway is to provide operations and maintenance access along the impounding structure. Much of the roadway is on property leased to the Minnesota Department of Natural Resources (DNR) for fisheries management purposes. Because of the constrained nature of the area, public access could not be guaranteed. The roadway could be blocked by equipment and/or materials during structure maintenance activities. Also, the DNR may restrict access in conjunction with its use of the fish-rearing pond.

8.26 Inset 2, Plate 5, shows how a small parking area could be developed. The design development was based on providing, at minimal cost, a small parking area with a turnaround. It would have no provision for turning around vehicles with trailers. The road would be appropriately signed to restrict vehicles pulling trailers. Because the area is expected to receive minimal use, only four parking spaces are indicated. This design allows for ease of expansion of the parking area. The existing roadway may need upgrading to allow for safe public access (see Table 9 for cost estimate).

8.27 Lac qui Parle Recreation Area

Parking is a major design concern on both sides of the river at Lac qui Parle. Insufficient parking spaces are available to safely accommodate the use that the sites currently receive. This problem is compounded by a lack of parking control on the west bank (the first few vehicles set the pattern for the rest), resulting in inefficient use of the area. The lot on the east bank dominates the area. Because of the lack of trees or shrubs surrounding the lot, visitors receive the impression of a parking area alone, rather than a recreation area with a parking lot.

8.28 Another concern at this area is the proposed new bridge across the dam, although no plans have been developed to date. The bridge is the responsibility of Chippewa and Lac qui Parle Counties. If a new bridge is built, the existing entrance roads may be too close to the structure for safety. Therefore, the proposed plans must be able to accommodate a relocation of the entrance roads.

8.29 East Bank

The goal of the changes to the east bank area is to reduce the dominance of the parking lot and create a more park-like atmosphere which should reduce operations and maintenance costs. Proposed circulation within the site was developed based upon the assumption that the entrance road would be relocated. The proposed plan has the entrance located approximately 230 feet east of the existing entrance, a location that would create a four-way intersection. Various parking lot configurations were considered, with emphasis on reduction in total area, simplified circulation, minimal disruption to the area, and compatibility with the existing and proposed entrances. The current parking lot does not provide for car-trailer parking. Any changes to the parking lot must include non-dead-end, loop circulation with a number of pull-through spaces for car-trailer use. The proposed plan (Plate 6) accomplishes the established goal and would provide 52 parking spaces, 12 for car-trailers. Should demand for parking spaces decrease, the lot can be shortened without changes in the circulation patterns. The lot would be farther from the riverbank, resulting in more area being available for public use (see Table 9 for cost estimates).

8.37 Picnic units accessible to handicapped visitors would be provided. (minimum of two).

8.38 Cost Estimates

The cost estimates in Table 9 were based on the conceptual plans as shown in this report. The estimates were developed to provide decision makers with an indication of the comparative costs of the various plan elements. A 20-percent contingency was used in the estimates because of the relatively straightforward nature of the work involved. The exception is the proposed area at the west bank of Marsh Lake, where a 33-percent contingency was calculated. The cost estimate for the proposed area was based on the parking area only, and does not account for any potential access road improvements required. Therefore, a greater than usual contingency factor was used.

8.39 No cost estimates were developed for the potential access roads at Lac qui Parle. Detailed designs and cost estimates will be prepared as a supplement to this master plan if it becomes apparent that new roads are required.

8.40 Effects of Proposed Plans

Table 10 compares the number of facilities to be provided by the proposed plan and the estimated facilities to be needed in the future. All estimated needs are met, with the exception of the sanitary requirements at Marsh Lake.

8.30 Plantings along the eastern property line would provide a definite boundary, thus reducing potential conflicts between the neighboring landowner and visitors to the Corps area. The screen/buffer plantings proposed would include honeysuckle, lilac, and a few trees such as crab apple, sugar maple, and ash. Care will be required in the placement of trees to insure their compatibility with the proposed revised parking area. Additional plantings of trees and shrubs in selected sites throughout the area will also provide shade for visitor comfort and safety.

8.31 The existing asphalt parking area is in relatively good condition. It is assumed that no redevelopment of the parking area would occur until the existing lot requires resurfacing, or until the construction of a new bridge across the dam creates the need for a new entrance.

8.32 Additional space is needed for uses such as picnicking. When the parking area on the west bank is redeveloped, it is proposed that the seven parking spaces immediately adjacent to the riverbank be removed to create additional space along the river for the visitors. The portable vault restroom described in paragraph 8.11 would be provided in the area between the parking lot and the river.

8.33 Additional picnic units at Lac qui Parle are required to lessen the impact of the existing use on project resources, and to channel use into specific areas, reducing maintenance costs. Picnic units would be placed within the area to help reduce the deficiencies in the total number needed and to spread the use over a greater area, thereby lessening the impacts. At least two units would be accessible to handicapped visitors.

8.34 West Bank

The additional parking spaces needed at the Lac qui Parle Recreation Area would be developed on the west bank area. As shown on Plate 6, a 44-car parking area could be developed in a relatively open area on Corps property. The lot should be paved and striped to fully utilize its capacity and, as proposed, would be able to accommodate a relocation of the entrance road. Fifteen parking spaces could be designated on the leased property along the existing roads with minimal widening and increased control of the parking pattern. As proposed, 59 parking spaces would be available, with 14 spaces that could accommodate car-trailer units. The additional spaces are needed for visitor protection. During periods of heavy use, visitors have parked along the highway, creating a serious traffic hazard.

8.35 The existing metal vault restrooms are well sited within the area. Replacements for the existing buildings should be located in the same area on Corps property. (See Table 9 for cost estimates.)

8.36 Planting efforts in this area are directed toward maintaining the existing conditions.

TABLE 9

COST ESTIMATES

Area	Units	Quantity	Unit Cost	Total Cost
Marsh Lake Recreation Area				
Parking Area				
Grading for access road and parking area	SY	4400	$.70	$3,960.00
Stabilized aggregate surfacing	SY	4400	1.85	8,140.00
Remove and relay parking blocks	Job	Sum	***	500.00
Fishing dock and walkway	Job	Sum	***	5,000.00
Paths (8 feet wide)	LF	200	1.85	370.00
Picnic units	EA	10	300.00	3,000.00
Two hardened sites	EA	2	20.00	40.00
Landscaping				
Topsoiling and sodding	Job	Sum	***	2,500.00
Trees	EA	12	350	4,200.00
Shrubs	EA	10	30	300.00
Signage	Job	Sum	***	500.00
				28,500.00
Contingencies (20%)				5,700.00
				34,200.00
Engineering				
Engineering and Design (12%)				4,100.00
Supervision and Administration				
Inspection (5%)				1,710.00
Overhead				
on Engineering and Design (13%)				530.00
on Inspection (13%)				220.00
Total				$40,760.00
Marsh Lake, West Bank Area				
Parking area				
Fill	CY	1000	3.00	3,000.00
Gravel Base	CY	200	6.00	1,200.00
Guard Posts	EA	10	40.00	400.00
Signage	Job	Sum	***	250.00
Contingencies (33.3%)				1,600.00
				$6,450.00
Engineering				
Engineering and Design (12%)				775.00
Supervision and Administration				
Inspection (5%)				325.00
Overhead				
On Engineering and Design (13%)				100.00
On Inspection (13%)				40.00
Total				$7,690.00

TABLE 9 (Cont)

Area	Units	Quantity	Unit Cost	Total Cost
Lac Qui Parle Recreation Area				
East Bank				
Parking Area				
Remove Existing Bituminous	SY	1,600	$1.75	$2,800.00
New Bituminous (w/sub-base, etc.)	SY	4,200	5.50	23,100.00
Paint Parking Strips	Job	Sum	***	1,000.00
Restroom (Pre-fabricated)	EA	1	7,500.00	7,500.00
Hardened Picnic Units	EA	2	20.00	40.00
Landscaping				
Topsoiling and sodding	Job	Sum	***	2,000.00
Trees	EA	6	350.00	2,100.00
Shrubs	EA	10	30.00	300.00
Screen Planting (Shrubs and Small Trees)	LF	370	20.00	7,400.00
Signage	Job	Sum	***	500.00
				46,740.00
Contingencies (20%)				9,350.00
				56,090.00
Engineering				
Engineering and Design (12%)				6,730.00
Supervision and Administration				
Inspection (5%)				2,800.00
Overhead				
on Engineering and Design (13%)				875.00
on Inspection (13%)				365.00
Total				$66,860.00
West Bank				
Parking Area				
Bituminous Surfacing of Existing Road	SY	625	4.00	2,500.00
Bituminous Surfacing for Parking Area (includes grading, sub-base, etc.)	SY	2,250	5.50	12,400.00
Paint Stripping	Job	Sum	***	1,000.00
Landscaping				
Top soiling, sodding, miscellanous shrubs around new parking area	Job	Sum	***	1,000
Picnic Units (Modify for handicapped)	Ea	2	25.00	50.00
				16,950.00
Contingencies (20%)				3,390.00
				20,340.00
Engineering				
Engineering and Design (12%)				2,400.00
Supervision and Administration				
Inspection (5%)				1,020.00
Overhead				
on Engineering and Design (13%)				320.00
on Inspection (13%)				130.00
Total				$24,250.00

Cost Estimates based on:
Estimating Section, St. Paul District, May 1980 price levels, and "Cost Data for Landscape Construction," Kerr Associates, 1980 Edition.

TABLE 10 COMPARISON OF THE PROPOSED PLANS AND ESTIMATED FUTURE RECREATION FACILITY REQUIREMENTS

	Parking Spaces		Picnic Units		Sanitary	
	Proposed	Est. Future Demand	Proposed	Est. Future Demand	Proposed	Est. Future Demand
Lac qui Parle	111	108	30	26	4/2+2	4/2+2
Marsh Lake	44	31	10	8	2/1+1	3/1+1

9.00 PLAN IMPLEMENTATION

9.01 No attempt has been made to rank, by priority, any of the specific items to be accomplished. Rather, the items are to be accomplished as funds and manpower allow. The only item for which order of accomplishment is a factor is the parking areas at Lac qui Parle. The number of parking spaces on the east bank should not be reduced until additional spaces are available on the west bank.

9.02 The development of the parking area and related improvements on the west side of Marsh Lake Dam would constitute a new recreation area. Under the current policy contained in ER 1120-2-404, new development can occur only with the aid of a non-federal sponsor. This cost-sharing program specifies that the non-federal sponsor must assume not less than 50 percent of the initial and future project development costs, plus all the operation, maintenance, and replacement costs of the facilities. The non-federal share would be approximately $3,850. The average annual operations and maintenance is estimated at $3,000 a year. (See Table 9.)

9.03 The changes proposed for the existing areas in the preceding section are intended to maintain the quality of the recreation areas, to improve accessibility for handicapped visitors, to improve visitor health and safety, and to continue to protect project resources. These items do not constitute new developments and can be implemented under normal operation and maintenance procedures.

9.04 The existing sanitary facilities currently meet minimum State and Federal abatement standards. It is proposed that a portable vault restroom be provided on the east side of Lac qui Parle. The use of the restroom will be monitored to determine whether or not providing a permanent restroom is justified. The Corps has the authority and responsibility to provide sanitary facilities at 100-percent Federal costs. The authorities were given, in part, by Executive Orders 11514 and 12088, and by the Water Pollution Control Amendments of 1972 (P.L. 92-500). Should it become necessary to provide a permanent restroom on the east side of Lac qui Parle, and/or to upgrade the existing facilities to provide for public health and meet all pollution standards, Code 710 funds will be requested.

9.05 The authorities for the Corps to provide facilities or to modify existing facilities to allow for accessibility by handicapped visitors are contained in part in the Architectural Barriers Act of 1968 (P.L. 90-480) and the 1973 Vocational Rehabilitation Act (P.L. 93-112). The laws mandate that all buildings and facilities constructed wholly or in part with Federal funds must be accessible by the physically handicapped and that no handicapped person can be excluded from any program or activity receiving Federal funds solely because of his or her handicap. Therefore, the Corps can make the necessary changes at 100-percent Federal cost at the existing areas.

10.00 CONCLUSIONS AND RECOMMENDATIONS

10.01 Conclusions

This revised master plan represents the conceptual basis for future recreational developments at the Lac qui Parle project. The proposed plans are consistent with the resource use objectives established for the project and are compatible with the existing plans of other agencies. A major aspect of the plans is to provide safe access to project resources for all visitors.

10.02 As the various changes are implemented, the project will continue to provide high quality recreational opportunities.

10.03 Recommendations

It is recommended that this master plan be approved and that it replace the currently approved master plan as the basis for development and management of the recreation facilities at the Lac qui Parle project.

EXHIBITS

EXHIBIT 1 PUBLIC PARTICIPATION

An interagency meeting and a public workshop were held on 7 June 1979 at Lac qui Parle. The purpose of these meetings was to establish communication with those agencies and individuals interested in the master plan for this project, and to obtain their views and ideas on how the Corps should manage the project in the future. Included in this exhibit are copies of the letters of invitation to the meetings and the respective mailing lists, and the attendance list from the public workshop.

All the agencies and individuals listed have been sent copies of this report with a request for their comments and recommendations. In addition, a public meeting will be held in the project area to obtain additional comments and recommendations.

DEPARTMENT OF THE ARMY
ST PAUL DISTRICT, CORPS OF ENGINEERS
1135 U S POST OFFICE & CUSTOM HOUSE
ST PAUL, MINNESOTA 55101

REPLY TO
ATTENTION OF:

NCSED-ER

We are currently updating our Master Plan for Public Use Development and Resource Management for the Lac qui Parle Lake Flood Control Project in westcentral Minnesota. The project consists of Marsh and Lac qui Parle Lakes, channel modifications between the Lac qui Parle Dam and Granite Falls, and a floodwater diversion structure on the Chippewa River near Watson. As part of this project, we manage recreation areas at the Marsh Lake and Lac qui Parle Dam sites. Our operating plan to control floodwaters involves manipulating the water levels in these lakes and conducting periodic clearing operations in the Minnesota River channel between Lac qui Parle Dam and Granite Falls.

As part of this updating process, we will examine existing resource developments and current use patterns, estimate future resource demands, and determine the adequacy of the existing master plan. Where necessary, we will develop revised site plans and resource management guidelines for development, management, and protection of project resources. This study is scheduled for completion in September 1979.

In an effort to coordinate this planning effort, we will hold an interagency meeting to brief and obtain pertinent comments from interested regional, State, and Federal agencies on the nature of the master planning study. The meeting will be held at 1:00 p.m. on 7 June 1979, at the Corps of Engineers maintenance area. The maintenance area is located north of Watson on CSAH 13, just east of where this highway crosses the Chippewa River. To reach this area from Watson, travel northwest on State Trunk Highway 7 to CSAH 13, then turn right. The maintenance area is about 1½ miles east.

An informal public workshop will be held at the same location at 3:00 p.m. that day. We hope those attending the interagency meeting will remain and participate in the workshop discussions.

NCSED-ER

I cordially invite you and/or members of your staff to attend the inter-agency meeting and the public workshop that follows. Please inform Mr. Franklin Star (612-725-5936) of my staff if you or your representatives plan to attend.

Sincerely,

for Roger D. Zack

FORREST T. GAY, III
Colonel, Corps of Engineers
District Engineer

DEPARTMENT OF THE ARMY
ST PAUL DISTRICT, CORPS OF ENGINEERS
1135 U S POST OFFICE & CUSTOM HOUSE
ST PAUL, MINNESOTA 55101

REPLY TO
ATTENTION OF:

NCSED-ER

18 June 1979

I would like to thank everyone who participated in the public workshop held on 7 June. The information that you provided has given us a better understanding of the existing conditions in the Lac qui Parle and Marsh Lake area. This information will assist us in developing a Master Plan for Public Use Development and Resource Management for Lac qui Parle Lake which more accurately reflects the public's recreational needs and desires. The information obtained will also help us to re-evaluate the reservoir operating plan.

Attached is a memo prepared by Franklin Star of this office which outlines the topics discussed at the workshop. Please review it to insure that all the topics discussed at the workshop have been covered. If anything has been inadvertently omitted from this memo, or if you know of other important topics which should be brought to our attention, please call Frank Star at 612-725-5936, or mail your comments to my attention at the above address.

In order to keep the overall planning process on schedule, please provide us your comments by the end of June. Any and all comments you may have will be appreciated. Thank you for your interest and your assistance.

Sincerely,

Robert F. Post

ROBERT F. POST
Chief, Environmental Resources Branch
Engineering Division

2 Incl
1. Memo for Record
2. Attendance List

DISPOSITION FORM

For ...e of this form, see AR 340-15, the proponent agency is TAGCEN.

REFERENCE OR OFFICE SYMBOL	SUBJECT
NCSED-ER	Public Workshop, Lac qui Parle Flood Control Project

TO	FROM	DATE	CMT 1
Memo for Record	Environmental Resources Branch	12 June 1979 STAR/ck/5936	

1. A public workshop was held 7 June 1979 at the Lac qui Parle maintenance building at Watson, Minnesota. The purpose of the workshop was to obtain the views of the public on the recreational uses of and problems associated with the Lac qui Parle Lake project. Fifteen people participated in this workshop (see inclosed list).

2. The following is a summary of the major points discussed at the workshop ("I think I remember what I thought I understood what they were meaning to say"):

a. Concerns were expressed about access to the west side of the Marsh Lake dam. Local residents had been driving on the access road along the top of the dam in order to get closer to fishing areas. However, project personnel have been directed to prevent public vehicular use of the road for two reasons. First, the dam was not designed to carry traffic. There has been some deterioration of the road in the past. Second, the current conditions pose a safety hazard for vehicles. The local residents believe the access road is a township road and cannot be closed. They also discount the safety arguments because of the history of public use. They requested that an access be provided. I pointed out that any improvements for access would be for recreational purposes and would require participation of a local cost-sharing sponsor. I also assured them that this issue will be addressed in the master plan.

b. The local residents generally agreed that too little was being done to enhance and promote the fishing in the lakes. Local residents recognize the entire project as a significant recreational fishing resource, and yet they believe that wildlife management, in particular goose management, dictates the use of the entire area. They wish to see greater emphasis placed upon fisheries management. Therefore, they requested that the Corps do whatever it can in terms of reservoir operations, access publicity, etc, that might improve fishing.

c. A number of points were made during the discussion concerning the operating plan and lake levels. For a number of reasons such as silting and excess upland drainage, some believe that the project no longer functions as intended and that its purpose should be abandoned. The lakes should be kept as full as possible with no flood storage available. Others pointed out that the project

☆ U.S. GPO 1977-0-765-124

NCSED-ER

12 June 1979
STAR/ck/5936

SUBJECT: Public Workshop, Lac qui Parle Flood Control Project

was built for flood control and that downstream land use reflects this. Lac qui Parle State Park is adversely affected by high water levels during the summer recreation season. The need to re-examine the current operating plan was generally agreed upon. The residents will be contacting the District Office to initiate the process. The conditions this past winter caused significant winterkills of fish within the reservoirs. Many believe that the Corps practice of lowering the reservoirs during the winter was a significant contributing cause. There was considerable discussion of reservoir operations and its effects. Everyone agreed that a meeting between the appropriate Corps, DNR, and local people is badly needed to discuss the current operating plan. In particular, there was interest expressed in keeping the lake levels higher throughout the winter.

d. A somewhat related point was an expressed desire to deepen the lakes by either a pool raise or dredging. This could improve the resource for fishing.

e. The residents want better access to the lakes, particularly on the east side of Lac qui Parle. It was pointed out that the DNR owned the land and that they would have to provide access in that area. It was also noted that better signage of the existing public accesses would be beneficial.

3. I informed the participants that they would have an opportunity to review the results of the workshop, as well as review and comment on the draft master plan. They will also be notified of all related future public meetings.

1 Incl.
As Stated

FRANKLIN E. STAR
Outdoor Recreation Planner
Public Use Development

CF: Dennis Cin, CO-PO
Arlee Keys, Park Manager, Valley City, ND
Curt Hanson, Lac qui Parle Project

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Mr. Charles A. Hughlett
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Twin Cities, Minnesota 55111

Regional Director
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Minnesota State Archaeologist
Department of Anthropology
ATTN: Christy Caine
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County Auditor
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Ms. Francis Perrizo
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Mr. Percy Aadland
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Mitlyng's Bait & Tackle
R.R. 1
Watson, MN 56295

Mrs. Mildred Randall & Jane
Milan Beach Resort
Milan, MN 56262

MAYORS

LuAnn Teigen, Mayor
Watson, MN 56295

Mr. John L. Mills, Mayor
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Montevideo, MN 56265

Mr. James Loher, Mayor
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Appleton, MN 56208

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Henry H. Nelsen
R.R. 2
Appleton, MN 56208

Pat Joyce
Madison, MN 56256

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Watson State Bank
Watson, MN 56295

Mr. Garry Barvels
R.R. 5
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Montevideo American - News
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Mr. Arlin Anderson
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Pete's Point
Granite Falls, MN 56241

Montevideo Rod & Gun Club
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The Nature Conservancy
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Mr. E. Gordon Siverson
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Honorable Leland Dalen
Mayor of Milan
City Hall
Milan, Minnesota 56262

Mrs. Bertha Gjergdahl
R.R.3
Appleton, Minnesota 56208

Honorable Kenneth Hartkopf
Mayor of Appleton
City Hall
Appleton, Minnesota 56208

Mr. Arlin C. Anderson, Manager
Lac qui Parle WMA
Watson, Minnesota 56295

Mrs. Leona Reinke
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Appleton, Minnesota 56295

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Appleton, MN 56208

Virgil Borstad
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Franklin Star
Corps of Engineers
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RR3
Appleton, Minnesota 56208

Prairie Sportsman Club
Contact person:
Mr. Steve Kufrin
RFD 3
Benson, Minnesota 56215

EXHIBIT 2

Licenses and Leases at the Lac qui Parle Project

The following licenses have been granted to the Minnesota Department of Natural Resources for recreation, fisheries, and wildlife purposes:

DA-21-018-Civeng-59-83
A 25-year license (1 October 1958 to 30 September 1983) on approximately 118.35 acres northeast of the Marsh Lake Dam. The major activity is wildlife management. The area is open to public hunting.

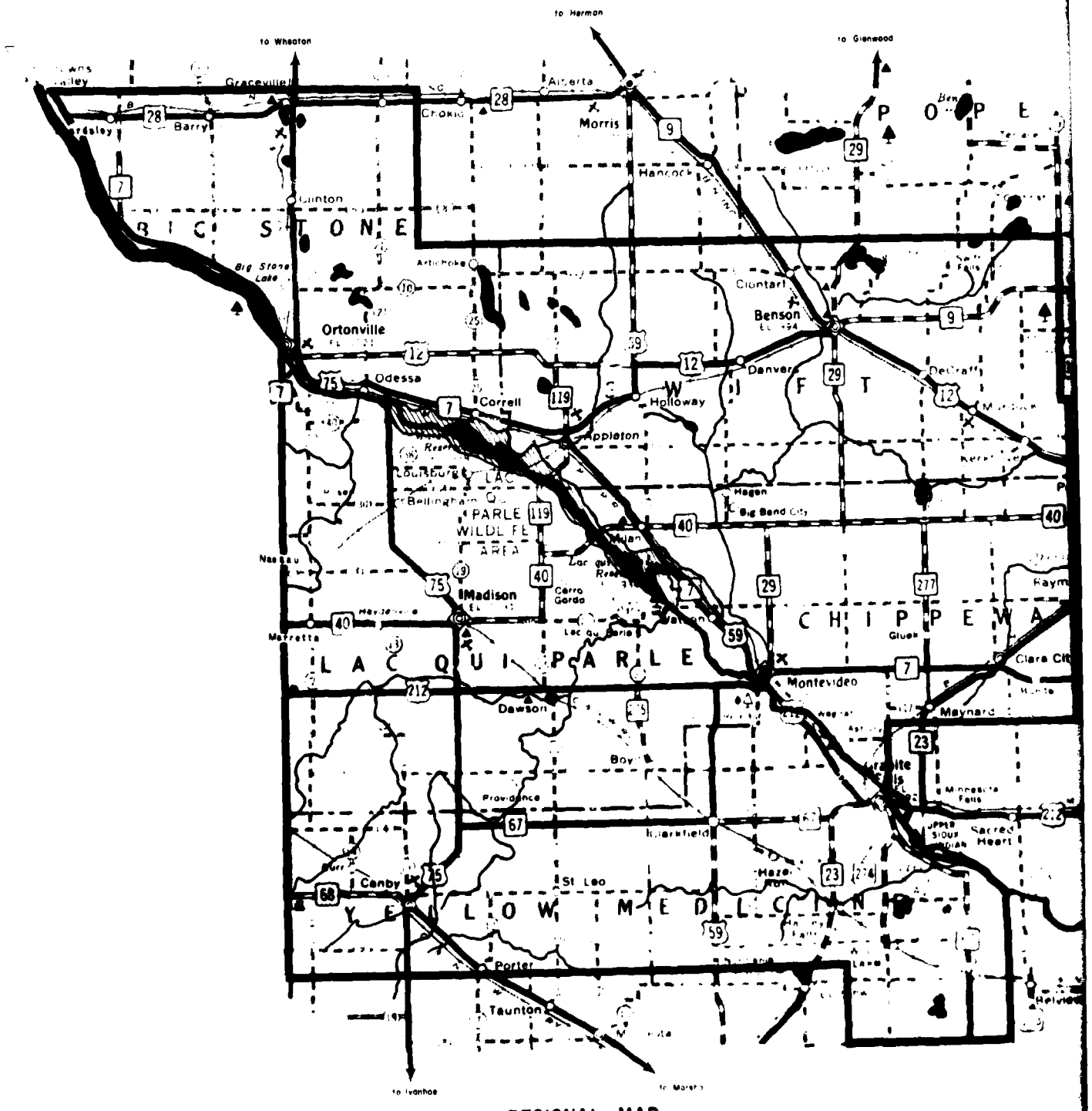
DA-21-018-60-80
A 25-year license (1 July 1960 to 30 June 1985) on approximately 218.5 acres located at the Lac qui Parle Dam and the Chippewa River Diversion structure and Watson Sag. The major activity is wildlife management, and in particular, waterfowl. The lands at Lac qui Parle Dam are within the wildlife refuge, while those lands associated with the Chippewa Diversion are open to public hunting.

DA-21-018-Civeng-62-99
A 25-year license (15 April 1962 to 14 April 1987) on 10.4 acres along the west side of Marsh Lake Dam. The major activity is a fish rearing pond.

DACW22-3-78-5265
A 5-year license (1 July 1978 to 30 June 1983) for construction and maintenance of a canoe portage around Lac qui Parle Dam, on the east side.

The Corps has leased approximately 1.67 acres from the Department of Natural Resources on the west side of Lac qui Parle Dam. The period of the lease is 10 years (1 May 1974 to 30 April 1984). The purpose of the lease is to provide increased public access to the river for recreational purposes.

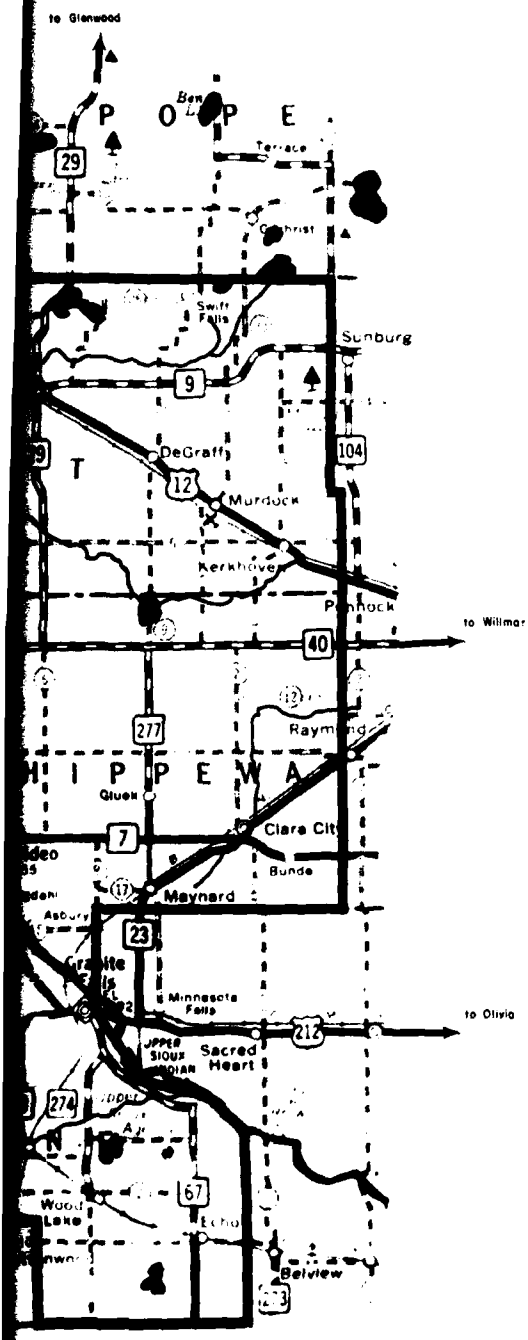
PLATES

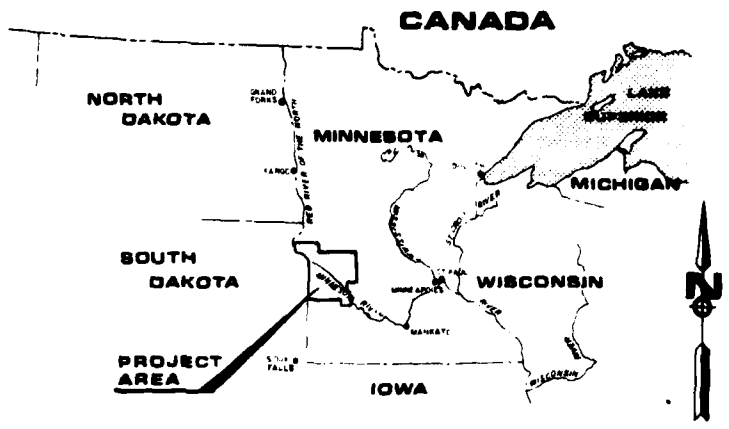


REGIONAL MAP

0 5 10 20

SCALE 5"=20MILES





LOCATION MAP

SCALE IN MILES

LEGEND

- U.S. HIGHWAY ROUTE MARKER
- STATE HIGHWAY ROUTE MARKER
- MULTILANE UNDIVIDED HIGHWAY
- HIGH TYPE
- INTERMEDIATE TYPE
- GRAVEL SURFACED
- SECONDARY ROAD - HARD SURFACE
- SECONDARY ROAD - GRAVEL
- LAKE
- STATE PARK
- STATE WAYSIDE PARK
- AIRPORT

MASTER PLAN FOR PUBLIC USE DEVELOPMENT AND RESOURCE MANAGEMENT

LAC QUI PARLE FLOOD CONTROL PROJECT

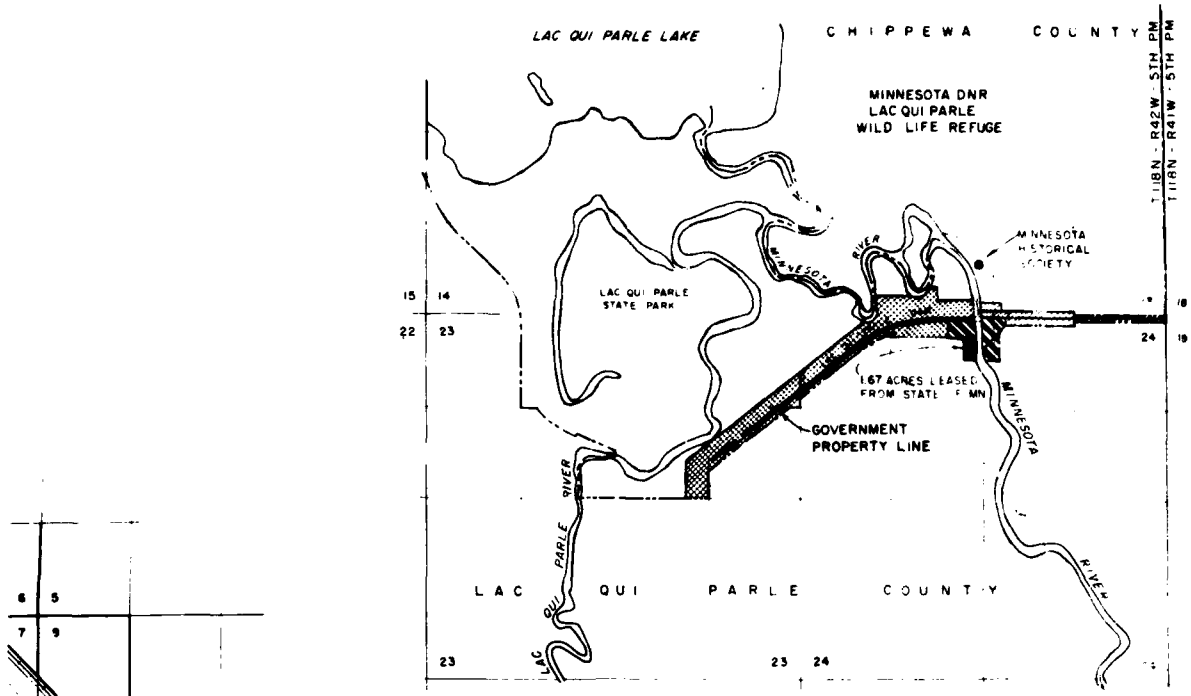
PROJECT LOCATION

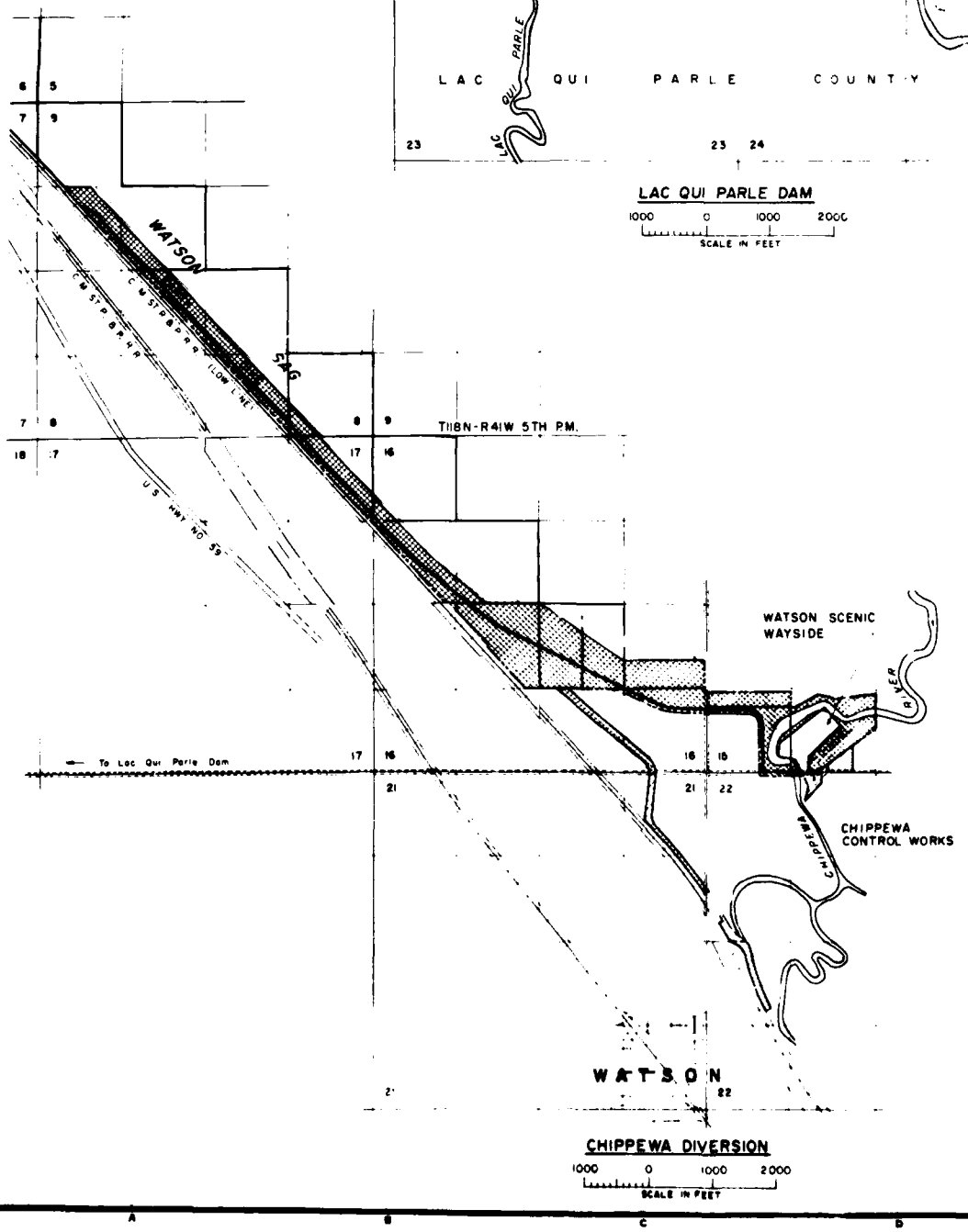
ST PAUL DISTRICT
CORPS OF ENGINEERS

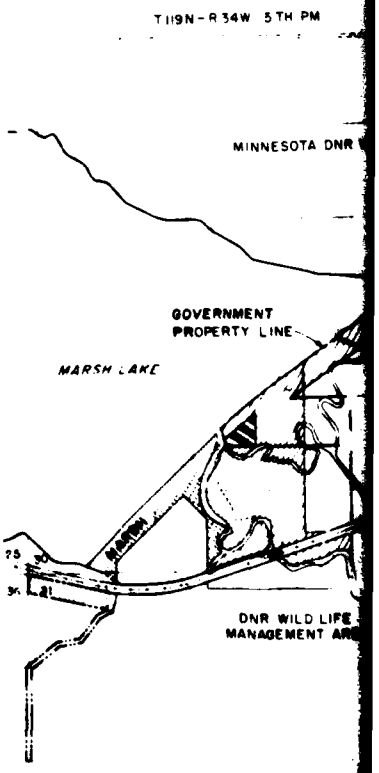
DATE JUNE 1980
DRAWING NUMBER

PLATE 1

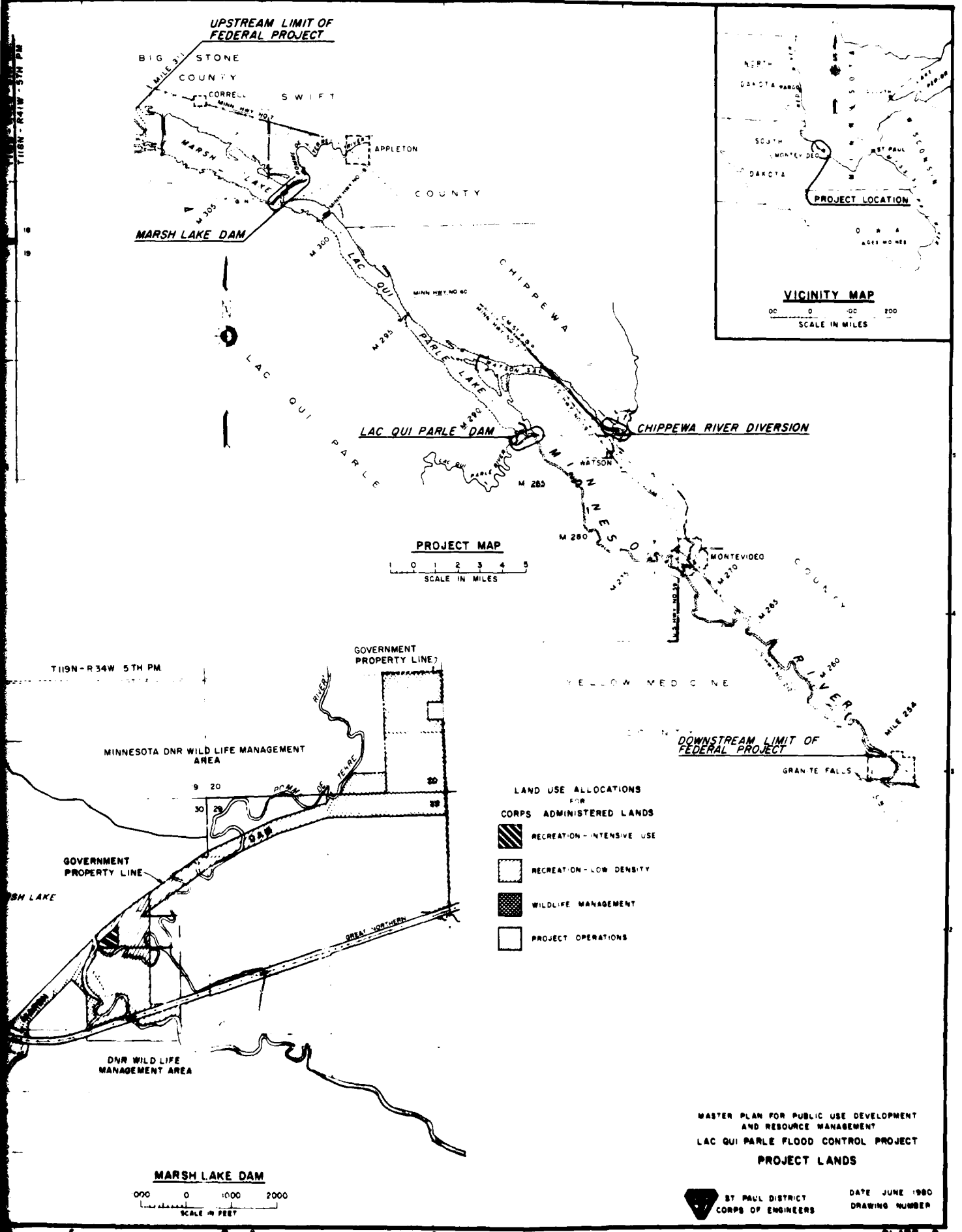
CORPS OF ENGINEERS







U. S. ARMY



MASTER PLAN FOR PUBLIC USE DEVELOPMENT AND RESOURCE MANAGEMENT

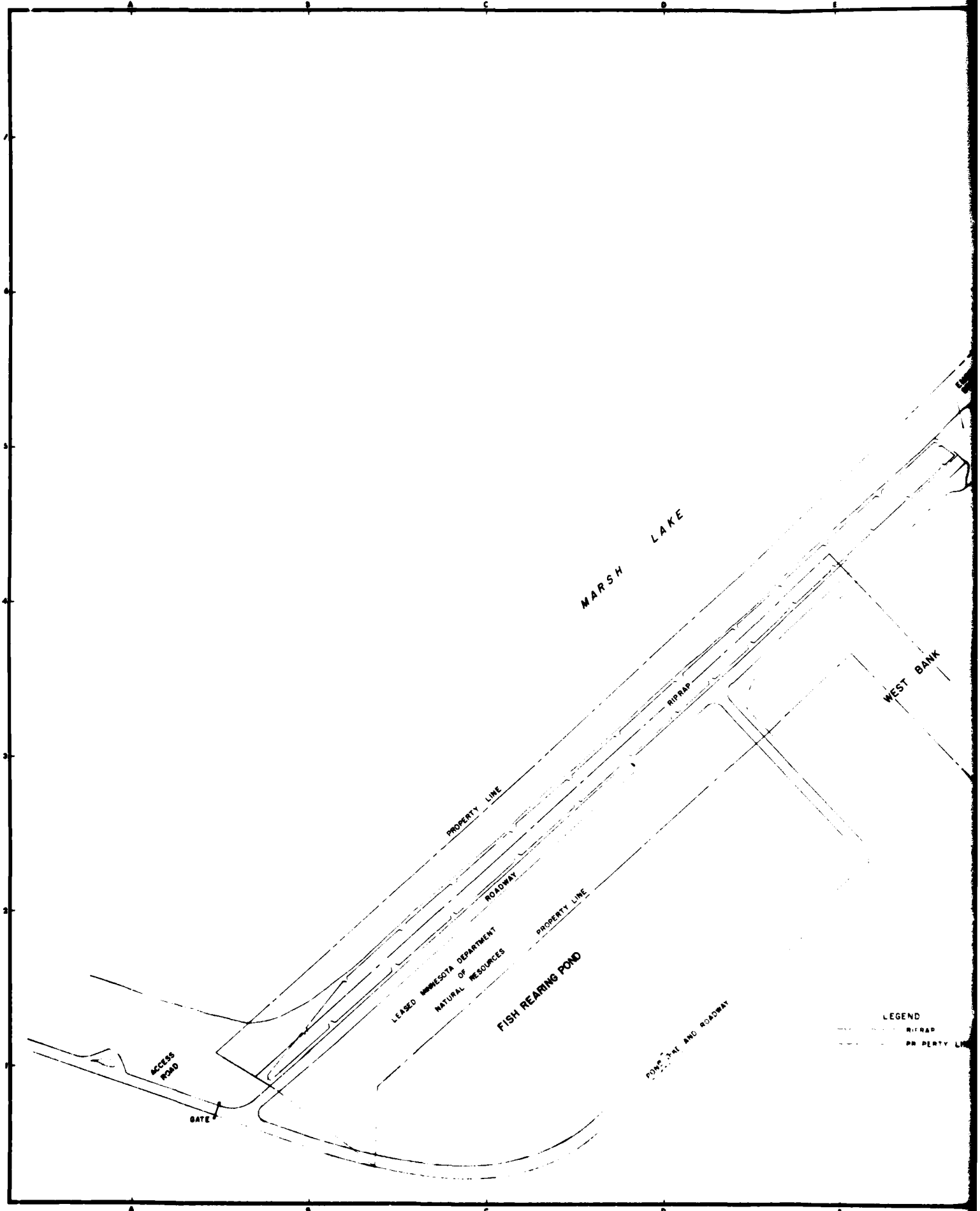
LAC QUI PARLE FLOOD CONTROL PROJECT

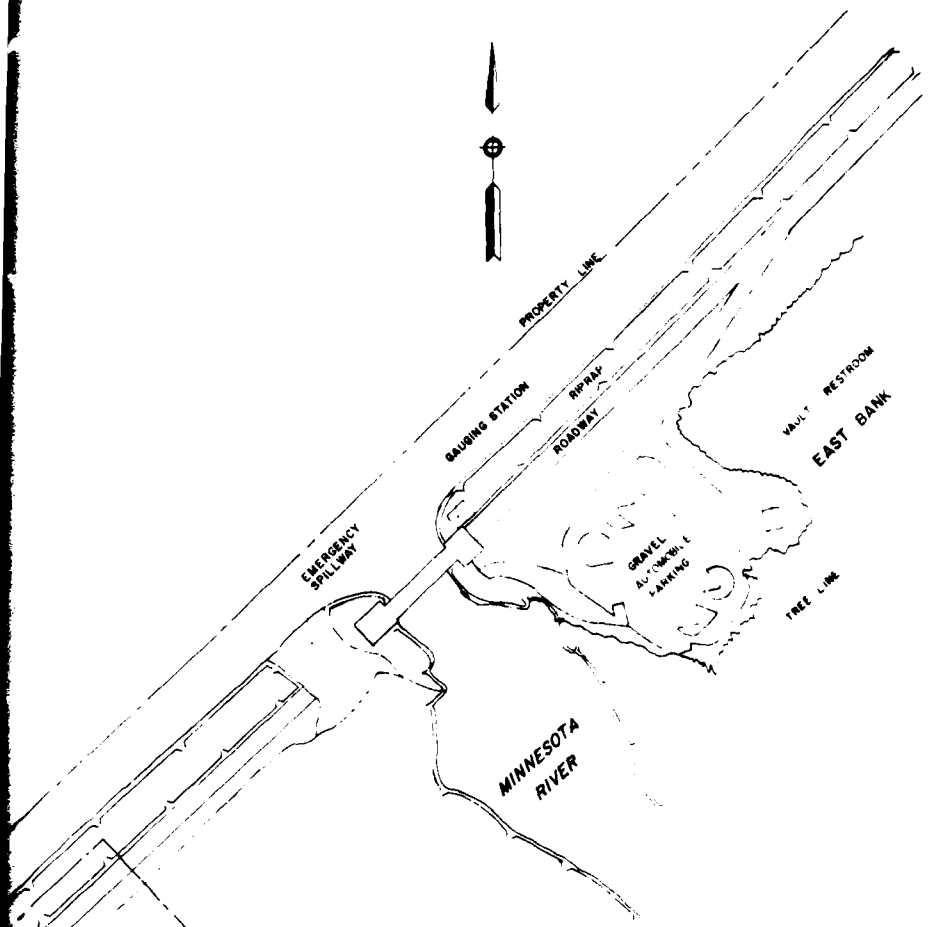
PROJECT LANDS

ST PAUL DISTRICT
CORPS OF ENGINEERS

DATE JUNE 1980
DRAWING NUMBER

PLATE 2


A
B
C
D
E
1
2
3
4
5
6
MARSH LAKE
WEST BANK
RIPRAP
PROPERTY LINE
ROADWAY
LEASED MINNESOTA DEPARTMENT OF NATURAL RESOURCES
PROPERTY LINE
FISH REARING POND
ACCESS ROAD
GATE
POND DIKE AND ROADWAY
LEGEND
RIPRAP
PROPERTY LINE



NOTE:
A COMPLETE DELINIATION OF U.S. GOVERNMENT PROPERTY LINES APPEARS ON PLATE 1

100 0 100 200 300 400
SCALE 1"=100'

36 24 12 0 36 72 108 144
SCALE: 1.00 CM=12.00M

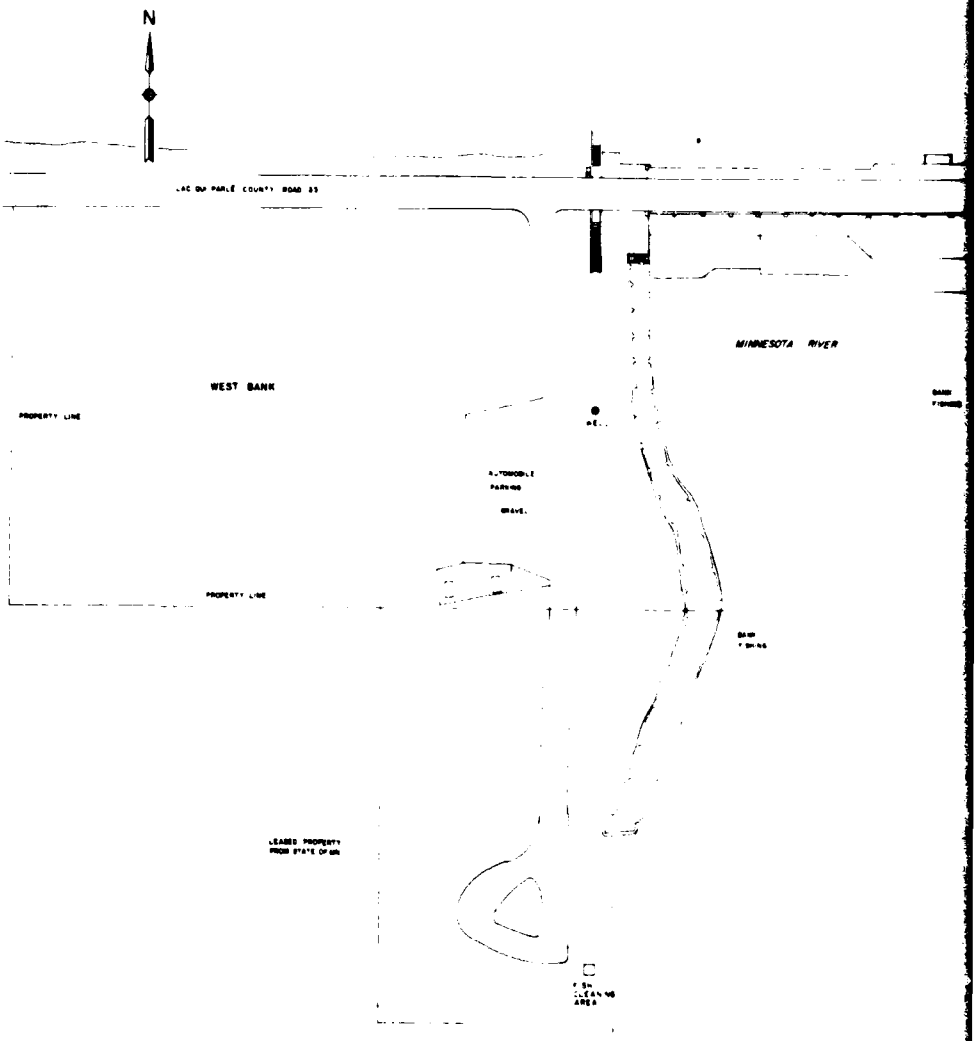
LEGEND
RIPRAP
PROPERTY LINE

MASTER PLAN FOR PUBLIC USE DEVELOPMENT AND RESOURCE MANAGEMENT
LAC QUI PARLE FLOOD CONTROL PROJECT
MARSH LAKE RECREATION AREA

ST PAUL DISTRICT
CORPS OF ENGINEERS

DATE JUNE 1980
DRAWING NUMBER

PLATE 3



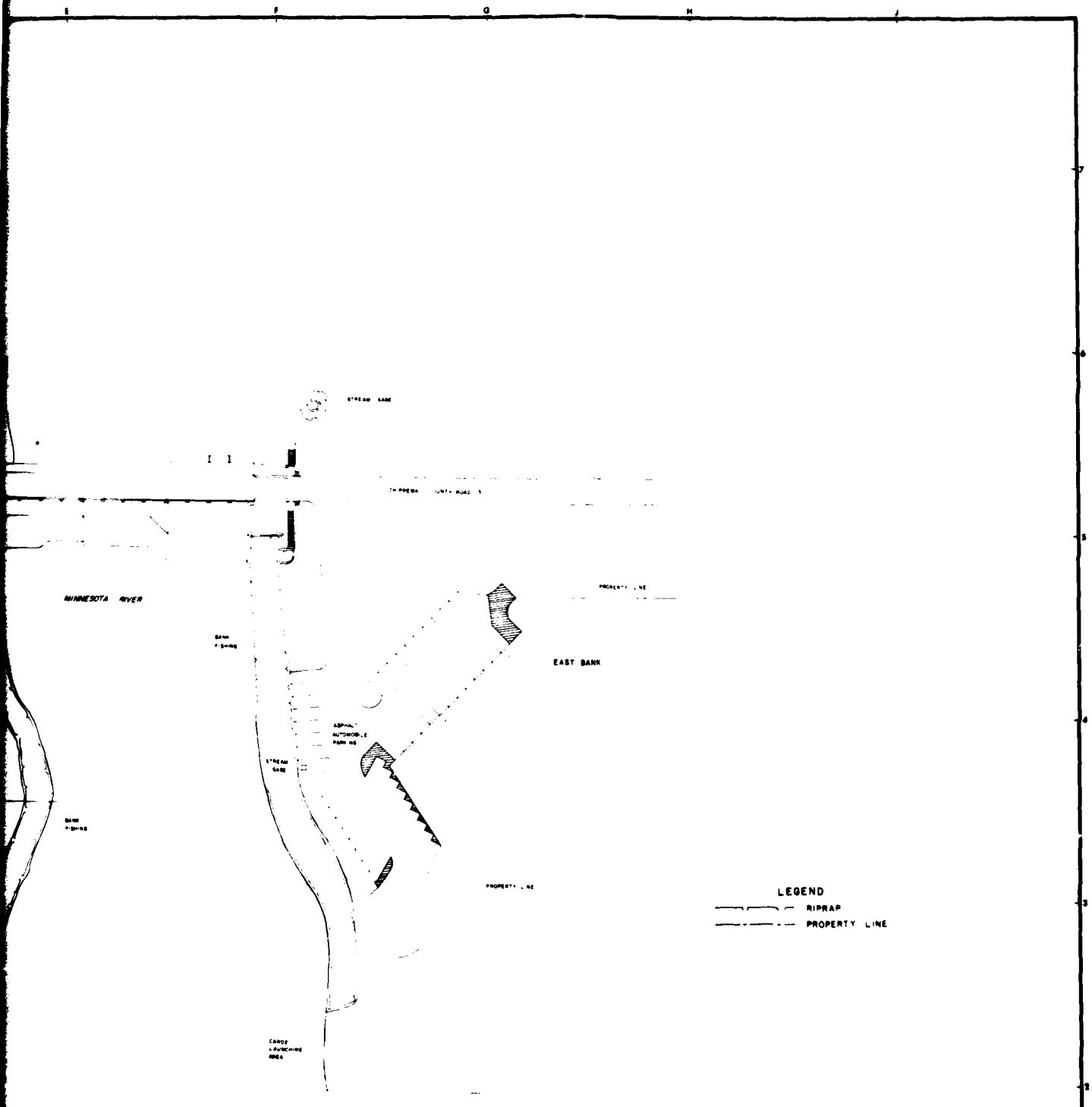
PLAN

50 0 50 100

SCALE 1"=50'

18 0 18 36

SCALE 1:00 CM=6.00 M



PLAN

-50 0 50 100 150

SCALE 1"=80'

0 18 36 54

SCALE 1.00 CM = 6.00 M

MASTER PLAN FOR PUBLIC USE DEVELOPMENT AND RESOURCE MANAGEMENT

LAC QUI PARLE FLOOD CONTROL PROJECT

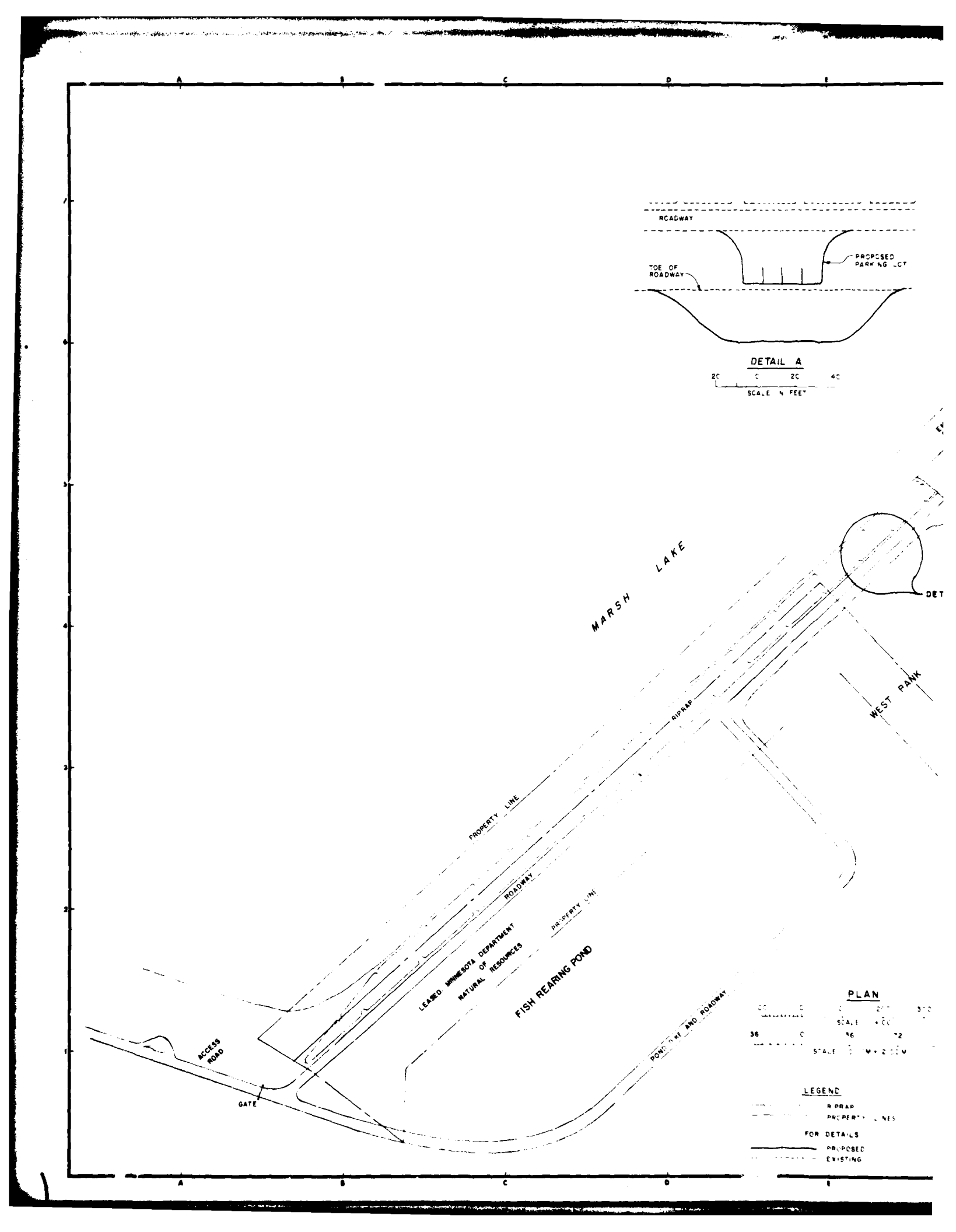
LAC QUI PARLE RECREATION AREA

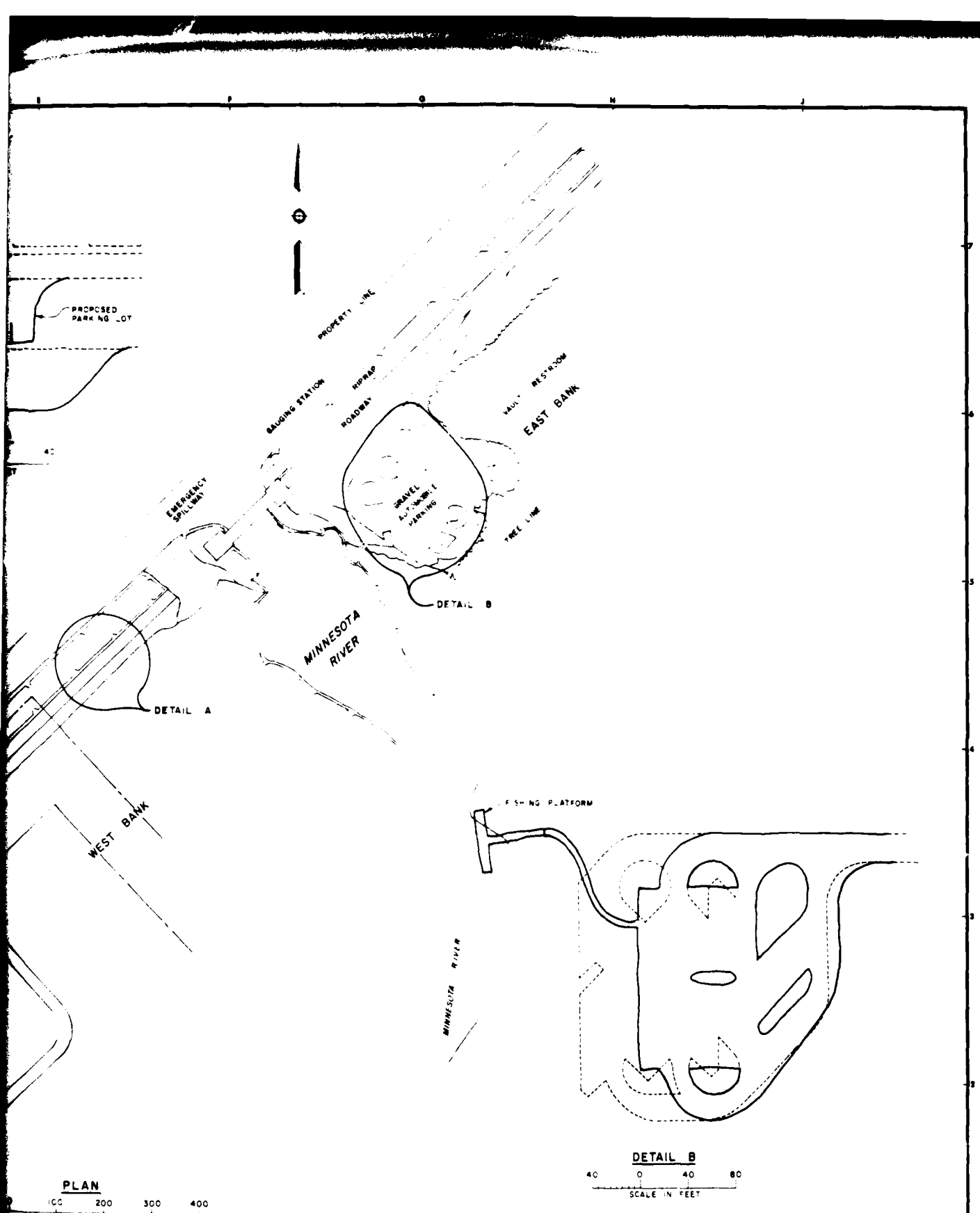
ST PAUL DISTRICT
CORPS OF ENGINEERS

DATE JUNE 1980

DRAWING NUMBER

PLATE 4


ROADWAY
TOE OF ROADWAY
PROPOSED PARKING LOT
DETAIL A
SCALE IN FEET
MARSH LAKE
RIPRAP
PROPERTY LINE
ROADWAY
LEASED MINNESOTA DEPARTMENT OF NATURAL RESOURCES
PROPERTY LINE
FISH REARING POND
ACCESS ROAD
GATE
WEST PARK
PLAN
LEGEND
RIPRAP
PROPERTY LINES
FOR DETAILS
PROPOSED
EXISTING



DETAIL B

40 0 40 80

SCALE IN FEET

PLAN

100 200 300 400

SCALE 1"=100'

36 72 108 144

SCALE 100 CM = 2 00 M

NOTE

A COMPLETE DELINIATION OF U S GOVERNMENT PROPERTY LINES APPEARS ON PLATE 1

LEGEND

RIPRAP

PROPERTY LINES

FOR DETAILS

PROPOSED

EXISTING

MASTER PLAN FOR PUBLIC USE DEVELOPMENT AND RESOURCE MANAGEMENT

LAC QUI PARLE FLOOD CONTROL PROJECT

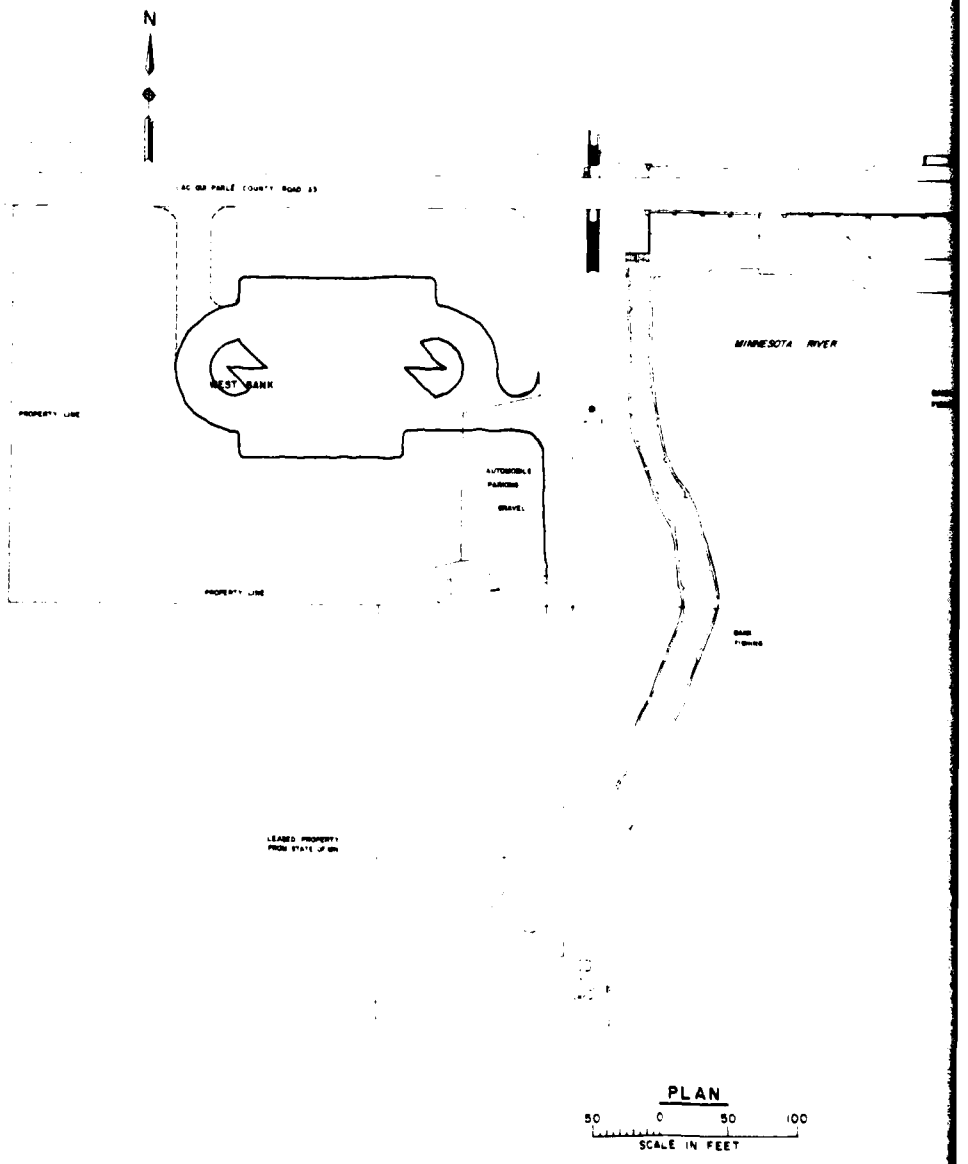
MARSH LAKE RECREATION AREA
PROPOSED CHANGES

ST PAUL DISTRICT
CORPS OF ENGINEERS

DATE JUNE 1980

DRAWING NUMBER

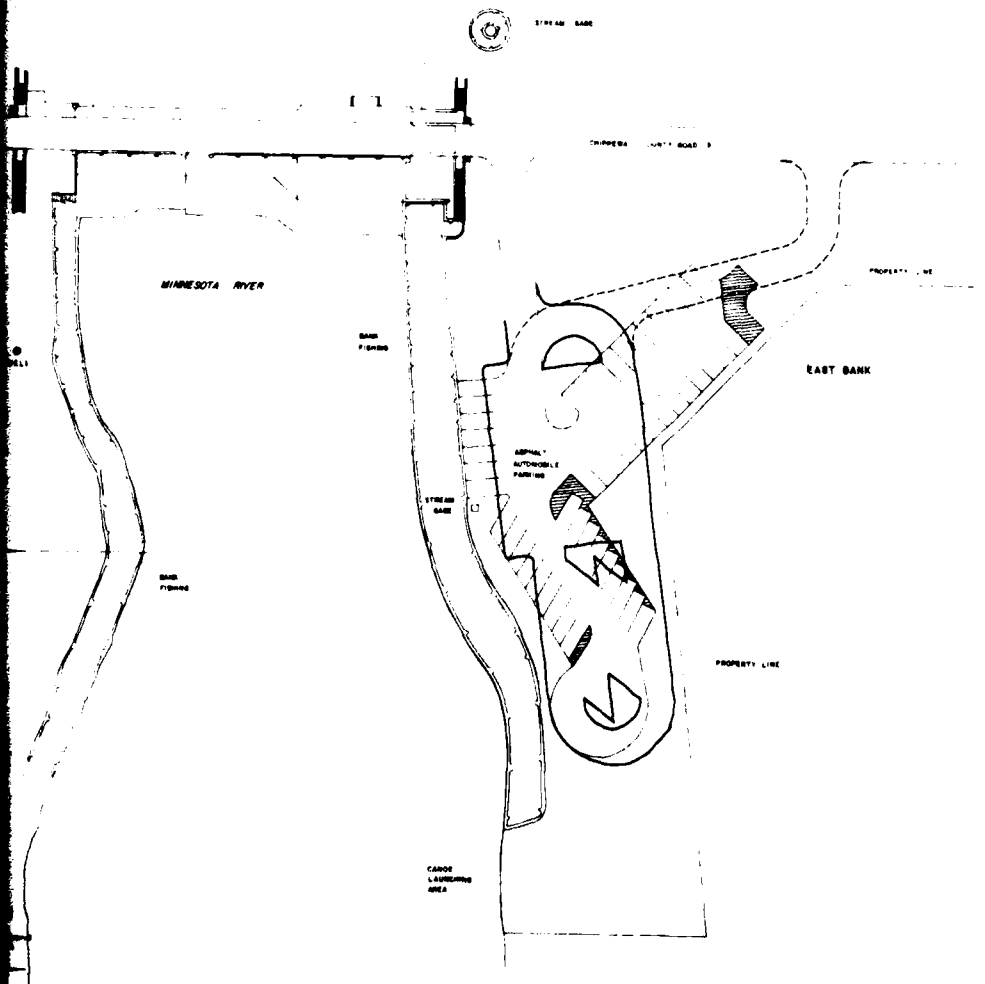
PLATE 5



PLAN

50 0 50 100

SCALE IN FEET



PLAN

0 50 100

SCALE IN FEET

LEGEND

PROPOSED CHANGES

PROPOSED CHANGES IF BRIDGE IS EXTENDED

NOTE:

EXISTING IS SHOWN AS SCREENED

MASTER PLAN FOR PUBLIC USE DEVELOPMENT AND RESOURCE MANAGEMENT

LAC QUI PARLE FLOOD CONTROL PROJECT

LAC QUI PARLE RECREATION AREA PROPOSED CHANGES

ST PAUL DISTRICT
CORPS OF ENGINEERS

DATE JUNE 1980

DRAWING NUMBER

PLATE 6

U.S.GPO:1980-665-155/16-6


DATE
ILME